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FINAL REPORT

PROTOTYPE OIL SHALE LEASING PROGRAM PROJECT

Prepared for

THE AREA OIL SHALE SUPERVISOR
Conservation Division
U.S. Geological Survey
Grand Junction, Colorado 81501
(Contract No. 14-08-001-15124)

by

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U. S. DEPARTMENT OF INTERIOR
OIL SHALE
ENVIRONMENTAL ADVISORY PANEL
Denver Federal Center

FINAL REPORT

PROTOTYPE OIL SHALE LEASING PROGRAM PROJECT
"MANAGEMENT PLAN AND GUIDANCE FOR LESSEES"

EXECUTIVE SUMMARY

Working under contract with the U.S. Geological Survey, the MITRE Corporation has developed, and presents here, a detailed Management Plan for the conduct of the Prototype Oil Shale Leasing Program. The Plan is presented to the Area Oil Shale Supervisor located in Grand Junction, Colorado. Documents presented include: "Final Report"; "Volume I - Management Plan"; and "Volume II - Guidance for Lessees". Primary project emphasis was placed on the Pre-Development Phase (that is, for year 1 through 5) of the Prototype Program.

The Prototype Oil Shale Leasing Program was initiated by the Department of the Interior in January 1974 with competitive lease sales of four 5,100 acre tracts of land in Colorado and Utah. The leases which define the terms and conditions under which the Lessees will conduct exploration and development activities also specify in detail stipulations designed to ensure adequate protection of the environment. It is the responsibility of the Area Oil Shale Supervisor, representing the Secretary, to supervise and regulate all on-tract prototype lease program operations. MITRE began work on this contract on 13 December 1974. Work was completed with publication of this Final Report.

MITRE team members performed two major tasks. First, an outline of a Detailed Development Plan was submitted. This document was prepared so that the Area Oil Shale Supervisor could direct the Lessees on the format and content of the plan to be presented by Lessees describing proposed tract development within the framework of the Lease and applicable governmental environmental regulations. Second, a Management Plan was submitted which set forth the objectives, tasks, procedures and a management structure for the Area Oil Shale Supervisor's Office during the Pre-Development Phase of the Prototype Program.

Volumes I and II describe the immediate assistance provided the AOSS by the development of an environmental baseline data matrix, the definition of Lessee report requirements, and the scheduling of inspection, review and approval functions. Implementation of a Management-By-Objectives system is described.

As called for in the contract, a Final Report is presented here for the personal review of the AOSS and his supervisors. It stresses the positive and negative aspects of MITRE's project activities. Major conclusions and recommendations are highlighted and are summarized below. (Text references are provided for detail.)

Monitoring of Lessee Performance (Section 5.2)

Conclusions

1) During the initial stages of the program, a shortage of staff hampered the Area Oil Shale Supervisor in providing positive guidance

to the Lessees with regard to complying with Lease Environmental Stipulations.

2) The staff shortage severely limited the Supervisor's ability to examine the regulations, laws, permits and licenses of Colorado and Utah that impact on Lessee operations.

Recommendations

1) The MITRE project produced numerous management aids for the purpose of assisting the AOSS and his staff to monitor Lessee performance and to meet the objectives of the Prototype Leasing Program. Among the aids were:

a) Appendix I-3 of the Management Plan, Volume I, outlines the Oil Shale Lease and presents Environmental Stipulations in a convenient tabular form.
b) Appendix I-2 of the Management Plan, Volume I, contains compilation of the regulations, laws, permits and licenses that impact on Lessee operations.
c) Appendix II-1 of the Management Plan, Volume II, contains an Outline of the Detailed Development Plan, the next major submission to be made by the Lessees.
d) Appendix II-2 of the Management Plan, Volume II, is an outline of the Quarterly Progress Reports, the key formal reporting documentation submitted by the Lessees.
e) Appendix II-3 of the Management Plan, Volume II, is a very detailed matrix of the Environmental Baseline Data to be gathered and evaluated by the Lessees.

Interfaces with Other Organizations (Section 5.3)

Conclusion (Section 5.3)

1) The Oil Shale Environmental Advisory Panel (OSEAP) was well conceived and serves a vital function by providing the Area Oil Shale Supervisor with a mechanism for public and other agency review, discussion and advice on environmental aspects of the prototype program.

Recommendation

1) The Supervisor proceed to schedule public hearings on the environmental provisions of the Detailed Development Plans, utilizing the advice and assistance of the OSEAP.

Keeping Pace with Changes in Technology (Section 5.5)

Conclusion

1) The Area Oil Shale Supervisor and his staff will not be able to keep up with the mass of pertinent regulations, technical publications and accumulated data.

Recommendations

1) The standardization of formats and procedures must be emphasized.

2) The Supervisor should utilize external support services like technical clipping services and automatic data processing where possible.

Future Oil Shale Leasing Activities (Section 5.7)

Conclusions

1) While personal contacts between the Supervisor and his superiors may be working well, there is no formal mechanism for surfacing and resolving major policy matters affecting the prototype program.

2) The major policy issues have been adequately identified by the Area Oil Shale Supervisor's Office.

3) The results of the prototype program must be available before a national decision with respect to future Federal oil shale leasing can be made.

Recommendations

1) Publication of the Department Manual which addresses formal and systematic reporting requirements should be expedited.

2) The Supervisor should be provided with timely methods for alerting policy-level officials in the Department to policy issues critical to the progress of the prototype program.

3) The Supervisor should be prepared to offer recommendations to policy-level departmental officials on whether or not the prototype program is meeting stated objectives.

FINAL REPORT

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1.0 INTRODUCTION

1.1 Background of the Prototype Program

Technically, the terms "oil" and "shale" are misnomers. It isn't really shale that is being mined but marlstone; and the marlstone contains kerogen, not oil.

The marlstone or oil shale found in the Green River Formation of Colorado, Utah and Wyoming is probably the richest in the world, averaging about 25 gallons per ton and found in deposits ranging to 1,000 feet thick. Oil shale is found in many parts of the world and is being mined in Russia, China and Brazil. The difference, other than yield, between these deposits and those in Green River is that the former came from marine deposits, the latter from salty lakes.

Until some 50 million years ago, Lake Uinta covered substantial parts of northwestern Colorado and northeastern Utah; it was roughly 20,000 square miles in area (nine times the present Great Salt Lake). Similarly, Lake Gosiute, about 4,000 square miles in area, covered parts of southwestern Wyoming. Both lakes were salty and alkaline, yet it is surmised that they abounded with life. Over millions of years, large quantities of organic matter, inorganic material and dust settled to the lake bottoms. As the waters receded, this material hardened into the stone now commonly referred to as oil shale. Through the passage of time, erosion caused veins of the oil shale to be exposed, and eventually early settlers found that the material would burn, albeit with soot and smell.

In addition to oil shale resources, the heart of the Piceance Basin contains substantial deposits of dawsonite (a potential new source of domestic aluminum) and nahcolite (the mineral form of baking soda). Recovery of these minerals is a potentially important by-product of commercial oil shale development activities in the Green River Formation.

As long as demands for oil could be met by conventional drilling in other parts of this country, commercial development of the oil shale deposits was not attractive. As this country became more dependent on imports to meet its demands, interest in developing the estimated 1.8 trillion barrels of oil in the Green River shale deposits increased. In 1964, Colony Development Operation initiated development of its semi-works plant on Parachute Creek, Colorado on private land; and in 1968, the Department of the Interior offered to lease oil shale tracts in Colorado. The government's offer found no takers. For more than 15 years Colony evaluated and experimented (The shale is mined and crushed, then heated in large structures called retorts. The heat causes the kerogen to vaporize, separating it from the rock in the shale. The vapor is collected and condensed, producing a semi-viscous substance called shale oil). In late 1974 the scheduled start of construction of the nation's first commercial oil shale complex was

suspended due to the uncertain economic climate.* Despite the failure in 1968, the government continued its leasing efforts, focusing on six tracts, two each in Colorado, Utah and Wyoming. The tracts were offered in November 1973 and the four in Colorado and Utah were sold. These tracts form the basis for the present prototype leasing program.

Despite the hiatus in Colony's activities, pilot development activities still continue on other privately-owned lands.** In September 1973, the Parahoe Demonstration was launched. Representing some 17 companies, Parahoe is keyed to demonstrating the potential of the Parahoe retorting process. Garrett Research and Development Company has been conducting small-scale in situ retorting experiments on its land near DeBeque, Colorado and plans scale-up tests in the future.

1.2 MITRE Contractual Involvement

Late in the summer of 1974 the USGS solicited proposals from Federal Contract Research Centers (FCRC) for management engineering support to the Area Oil Shale Supervisor's Office. Specifically covered was the need for a management plan describing office accounting and recordkeeping procedures, interfaces with the Lessees, outlines for baseline data reports and detailed development plans, and formats for the quarterly and annual progress reports. On 13 December 1974, MITRE was awarded the contract*** based upon its proposal**** to assist the Area Oil Shale Supervisor. Contract startup was initiated on 15 December, but since the contract was still being negotiated at that time, these early efforts followed the work set out in the proposal. Although both the contract and the proposal were costed for 21 man-months of technical staff support, the emphasis on the tasks to be performed and the times for performance differed. With regard to the tasks, whereas the proposal focused on a Baseline Data Report Management Plan and a Detailed Development Plan Management Plan, the contract keyed on the preparation of a single Management Plan and a Final Report. As for performance, the proposal allowed for a 3-1/2 month time period; the contract imposed a three-month period. Although the MITRE project team was composed of a variety of management, environmental, economic and legal specialists and the team was supported by many other specialists in MITRE's Energy, Resources and the Environment Division, the resolution of differences in the contract and the proposal caused

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* Shale Country, Vol. 1, No. 2, February 1975, p.2.

** The Federal government owns approximately 80 percent of the oil shale reserves; approximately 20 percent are privately-owned.

***Contract 14-08-000-15124 issued to MITRE by the U.S. Geological Survey, Branch of Procurement and Contracts, Reston, Virginia.

**** "A Proposal for the Formulation of a Management Plan for the Assessment of Lessee's Baseline Data Report and Detailed Development Plan in Support of the Area Oil Shale Supervisor," 11 December 1974, the MITRE Corporation.

significant delays in organizing initial work. The result was that the team was committed to a greater level of detail than had been anticipated; a 15-day extension to the contract was negotiated (to 15 April) in order to do all the work required.

1.3 Calendar of Contractual Events

Figure 1 presents the schedule for delivery of documents on the contract. Also shown are the dates when delivery was made. The delays in making delivery were a direct result of the ambiguities between the proposal and the contract. As shown in the figure, the project team put most of its earlier efforts into perfecting the development plan outline, efforts that had not been anticipated and which forced delay in work on the management plan.

Section 3 below discusses the tasks involved in producing these documents.

2.0 THE MITRE PROJECT TEAM

2.1 Organizational Concept

The project team was composed of five members from two departments (D-51 and D-52) and managed by Dr. Gregory Haas, Division Staff of Division 50. Team members were: James Antizzo, James Clark, Mark Doherty, A.C. Johnson, and Howard Williams.

Responsibility for different portions of project planning the Detailed Development Plan, Quarterly Progress Report, Environmental Baseline Data Matrix, the management plan, and the final report were divided among the team members according to their fields of expertise and areas of knowledge. As the different sections of the project components were completed, the entire team had an opportunity for review and comment. The necessary background research was divided among the team members in accordance with their needs to complete their respective sections but with reliance upon other team members for information from their fields of expertise.

For detailed information beyond the project team's capabilities, the team called upon the diversity of skills throughout the Energy, Resources and the Environment Division (Division 50) as well as the assistance of consultants to The MITRE Corporation.

To better coordinate with and obtain information from the contract sponsor (the Area Oil Shale Supervisor), the project team established a field office in Grand Junction, Colorado.

Figure 2.1 depicts the organizational concept of the project team. As can be noted on the diagram the project team closely coordinated with team members, other Division 50 staff members, and consultants to The MITRE Corporation.

Figure 2.2 summarizes the area to which project team members, other MITRE staff, and consultants contributed significantly.

2.2 Staff Selection

Selection of the staff members for the project team was based upon the kinds of skills required by the MITRE proposal (11 December 1974) to the U.S. Geological Survey to support the Area Oil Shale Supervisor. The Energy, Resources and the Environment Division of The MITRE Corporation is comprised of some 88 professional staff from which six personnel based on educational backgrounds and areas of expertise were designated to compose the project team.

2.3 MITRE Staff Resources

The professional staff of the Energy, Resources and the Environment Division has a broad range of disciplines including:

FIGURE 2.1

ORGANIZATIONAL CONCEPT

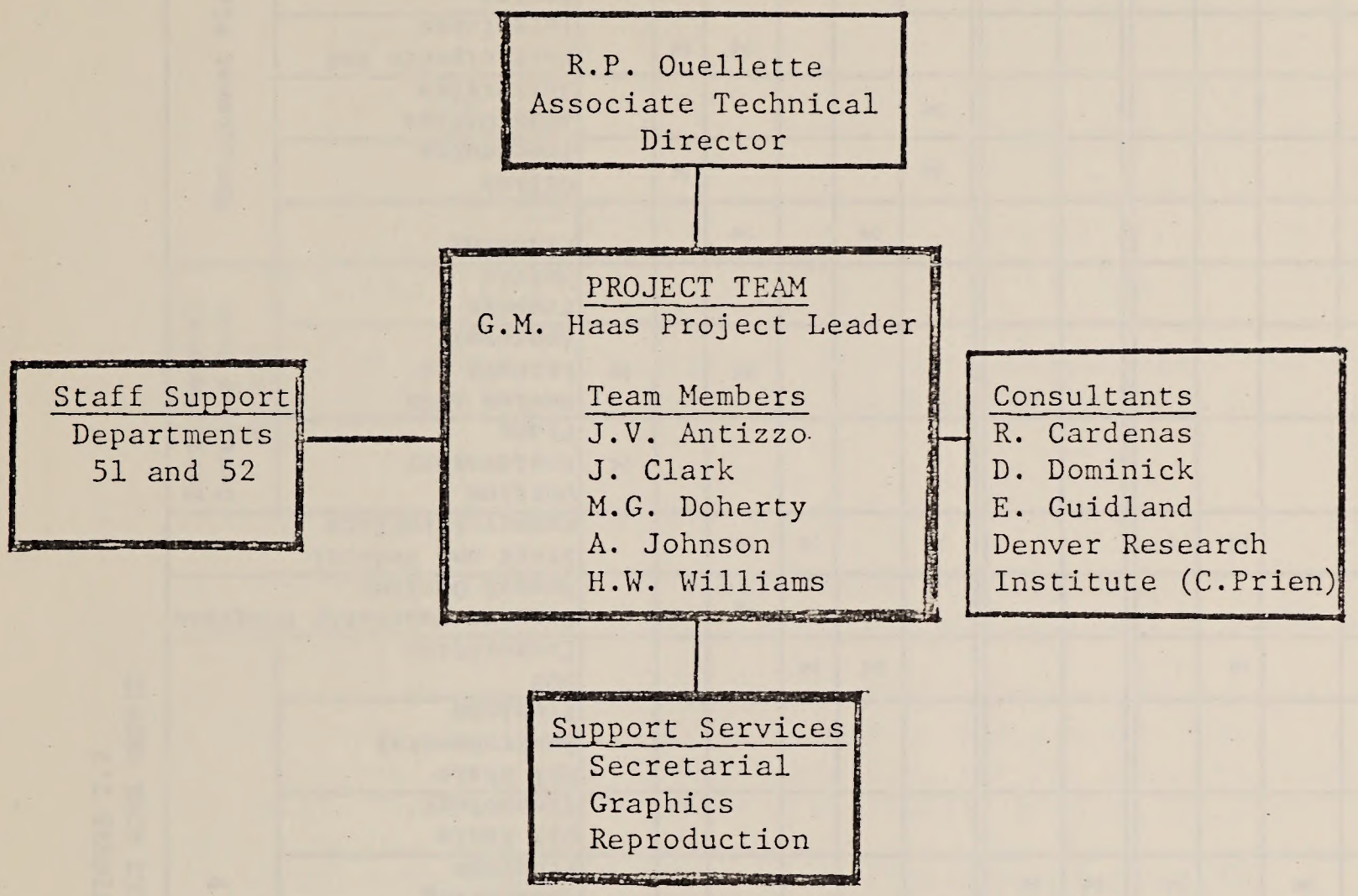


FIGURE 2.1

ORGANIZATIONAL CONCEPT

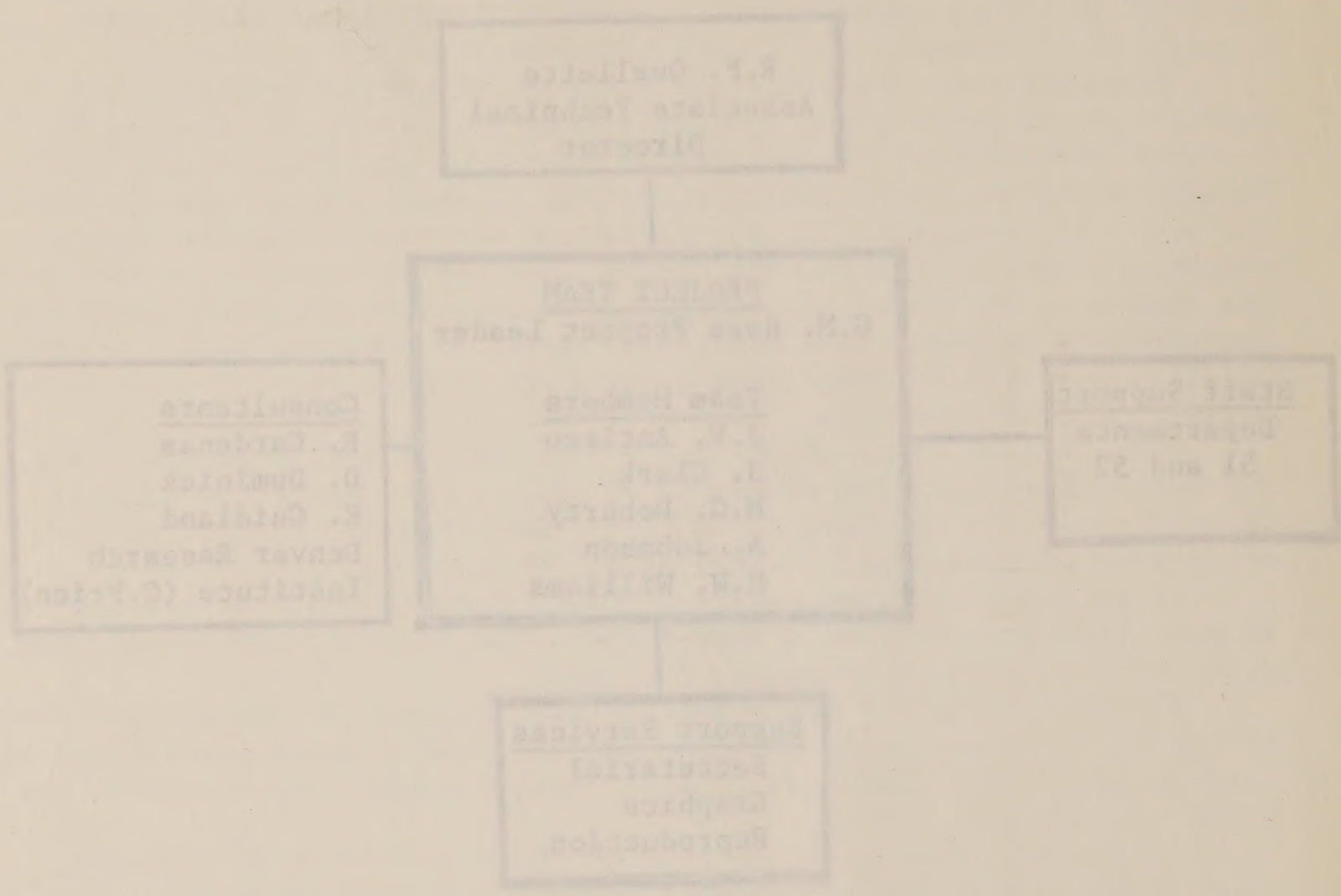


FIGURE 2.2
PROJECT WORK MATRIX

| Project Team | | |

Program Planning
Energy
Data Systems
Environmental Monitoring
Environmental Assessment
Economics
Legal
Ecology
Land Use
Geology
Mining
Air Pollution/Quality
Water Pollution/Quality
Noise

The project team received support from the division staff for areas which were outside the team's expertise, such as air quality, meteorology, and biology.

2.4 Project Team Consultants

To assist the project team several consultants to The MITRE Corporation were utilized. These consultants are retained by MITRE and used as the need arises.

Mr. David Dominick, a lawyer, specialized in environmental policy issues which were critical to the work done by the project team. Dr. Raul Cardenas, an expert on water quality, and Dr. Erick Guidland, a hydrologist, reviewed and prepared a monitoring program for ground and surface water.

To better understand oil shale technology and the possible environmental effects of an oil shale industry The MITRE Corporation hired Dr. Charles Prien of the Denver Research Institute as a consultant.

2.5 Facilities

The MITRE Corporation used two facilities for the contract. The main center for the project team was The MITRE Corporation's Washington Operations headquarters in McLean, Virginia. A field site office in Grand Junction, Colorado was opened in January 1975 and closed 15 April 1975. The field site office was manned by at least one member of the Technical Staff approximately 60 percent of the time and full-time by a secretary. The Grand Junction office facilitated communication with and reviews by the AOSS and his staff.

2.6 Support Services

With the exception of the secretary at the Grand Junction field site office, secretarial support was handled through the Washington Operations of MITRE. All graphics and reproduction services were done at MITRE Washington.

3.0 TASKS PERFORMED ON THE CONTRACT

3.1 General

This section describes the work performed by MITRE in terms of the documents required by the contract. Each of the eight deliverables addressed by MITRE is discussed with respect to how the work was accomplished, the time involved, and pertinent aspects of the contents of the document (Although the contract treated the Example Quarterly, and the Interim Baseline Data Report as a single document, the project team decided that there were actually two documents involved and so outlines of a Quarterly Report and a Baseline Data Report were generated). In addition, important internal MITRE communications and policy communications with the AOSS are discussed.

3.2 Plan of Performance

The contract stated that this plan was due one week after contract award(i.e., 20 December 1974). Section B of the Contract Work Statement lists nine tasks to be performed by the MITRE team. Unfortunately, due to delays in receipt of the contract, the team was not able to provide the plan on schedule. On 20 January, the plan of performance* was submitted to the Area Oil Shale Supervisor (AOSS); it identified which members of the project team were responsible for each of the nine tasks, provided detailed travel plans, presented a detailed time schedule, and gave a preliminary estimate of how contract funds were to be expended through 31 March.

The difficulty in formulating this plan was that the tasks involved efforts like identifying requirements set out in whatever regulations applied as well as those cited in the lease. This involved researching EPA, state and local regulations, determining which had precedence, and abstracting the pertinent information. The magnitude of the time and effort involved in performing this task was difficult to estimate. Similarly, the task of synthesizing for each Lessee all the work that he was committed to doing caused the team great concern because it required detailed reviews of a lengthy lease containing very specific environmental stipulations, of fairly complex Exploration Plans in various stages in the USGS review process, and of the AOSS's correspondence with the Lessees relative to interpretations of requirements. A further compounding of the problem was that extensive travel to Colorado was seen to be necessary in order to gather the reference documentation.

3.3 Weekly Technical Letter Reports

Because of the relatively short performance period, the contract required that weekly technical reports be submitted in letter form. The reports were designed not only to report progress but also problems encountered and action items for the near future. The first report was to cover the first two weeks.

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*MITRE letter D50-211, dated 20 January 1975.

As shown in Figure 3.1, the reports were not submitted on a regular schedule due, in part, to the fact that team members were almost continuously in travel and the project team leader was in constant contact by phone with the AOSS. In those instances when almost the entire team traveled to Colorado to meet with the Lessees, the Oil Shale Environmental Advisory Panel, and members of the AOSS office, the letter reports were delayed significantly.

The format for these reports was simple; there were three sections addressing Accomplishment, Problems, and Plans.

It was felt by the team that the primary reason for these reports was to inform the AOSS of problems that were in existence or were foreseen. An almost constant reference in each of the reports is made to work on the Detailed Development Plan (DDP). In the report of 20 January*, a question on the amount of detail required in the DDP was raised as well as the potential difficulty in acquiring the needed information. To help in planning the AOSS was asked to submit a list of priorities for team work. In the 29 January report, difficulties encountered in trying to obtain information for the DDP from the C-a Lessees and their consulting engineers (Cameron) were cited. In the 26 February report, concern was expressed over discussions with the C-b Lessees on the DDP; their idea of the structure and contents of the document were at odds with what the AOSS and the MITRE team felt were necessary. In the 27 February report (covering the weeks of 17 and 24 February), the problem of distributing the DDP outline to interested parties for review and revising the outline in accordance with these reviews in time to meet the 15 March outline submission date was addressed.

It is felt that the letter report served its purpose of documenting the actions taken by the team in the light of the circumstances that were impacting at the time. The MITRE team also generated a number of internal memoranda as well as communicated by letter with the AOSS on a variety of topics as the need arose. These memoranda and letters are also listed in Appendix V. The more significant documents - those relating to concern over policy issues, contents of the DDP, and lease ambiguities - are discussed in Section 3.9 below.

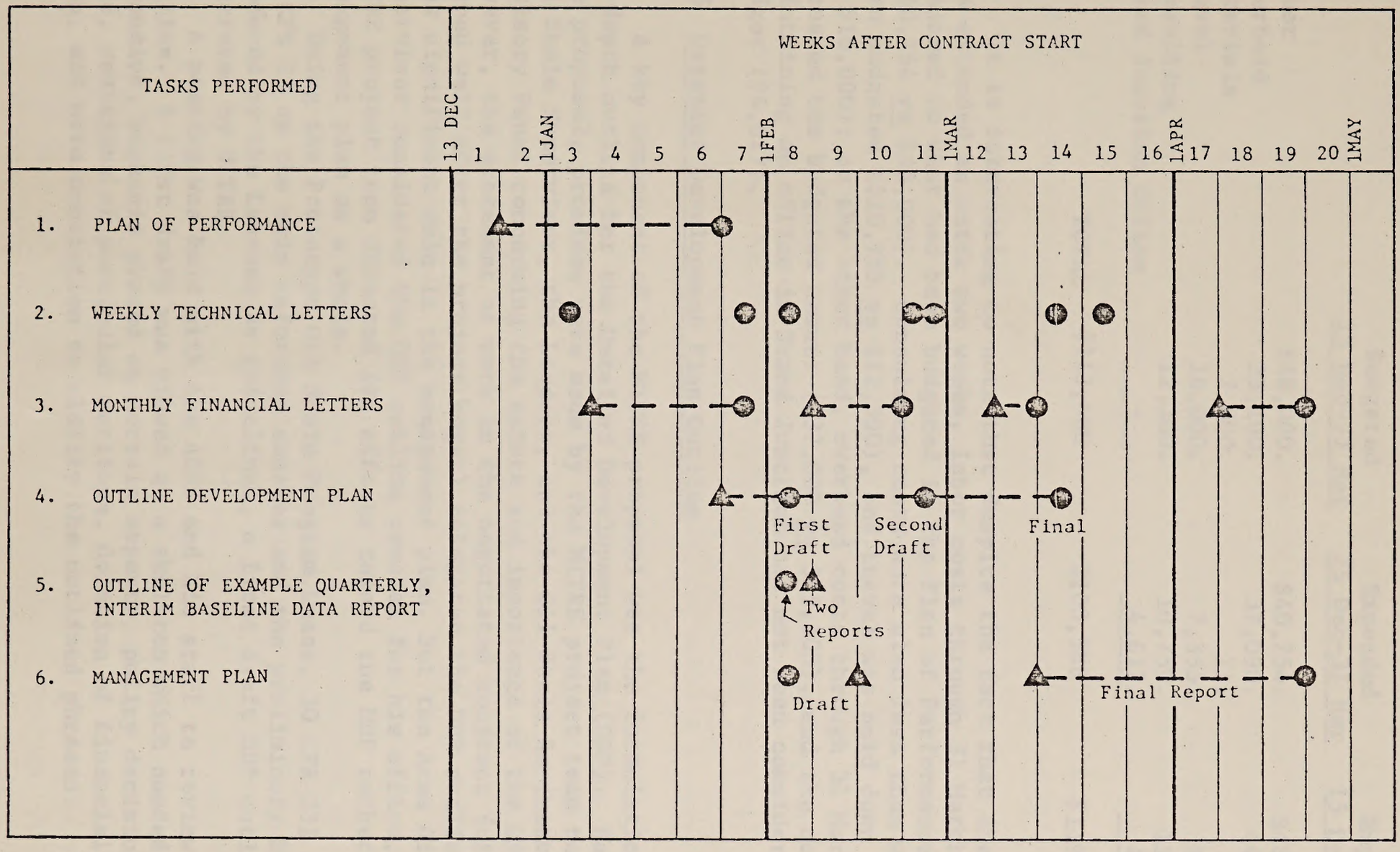
3.4 Monthly Financial Letter Reports

Imposed by the contract, these reports summarized expenditures for the month being reported and accumulated expenditure through the month. Four reports were submitted. The fourth report covered March and the first half of April (the contract was extended by the AOSS through 14 April).

The table below indicates the monies expended in the various major expense categories over the contract.

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* All reports are listed in Appendix V, Bibliography of Internal Memoranda and Letters.



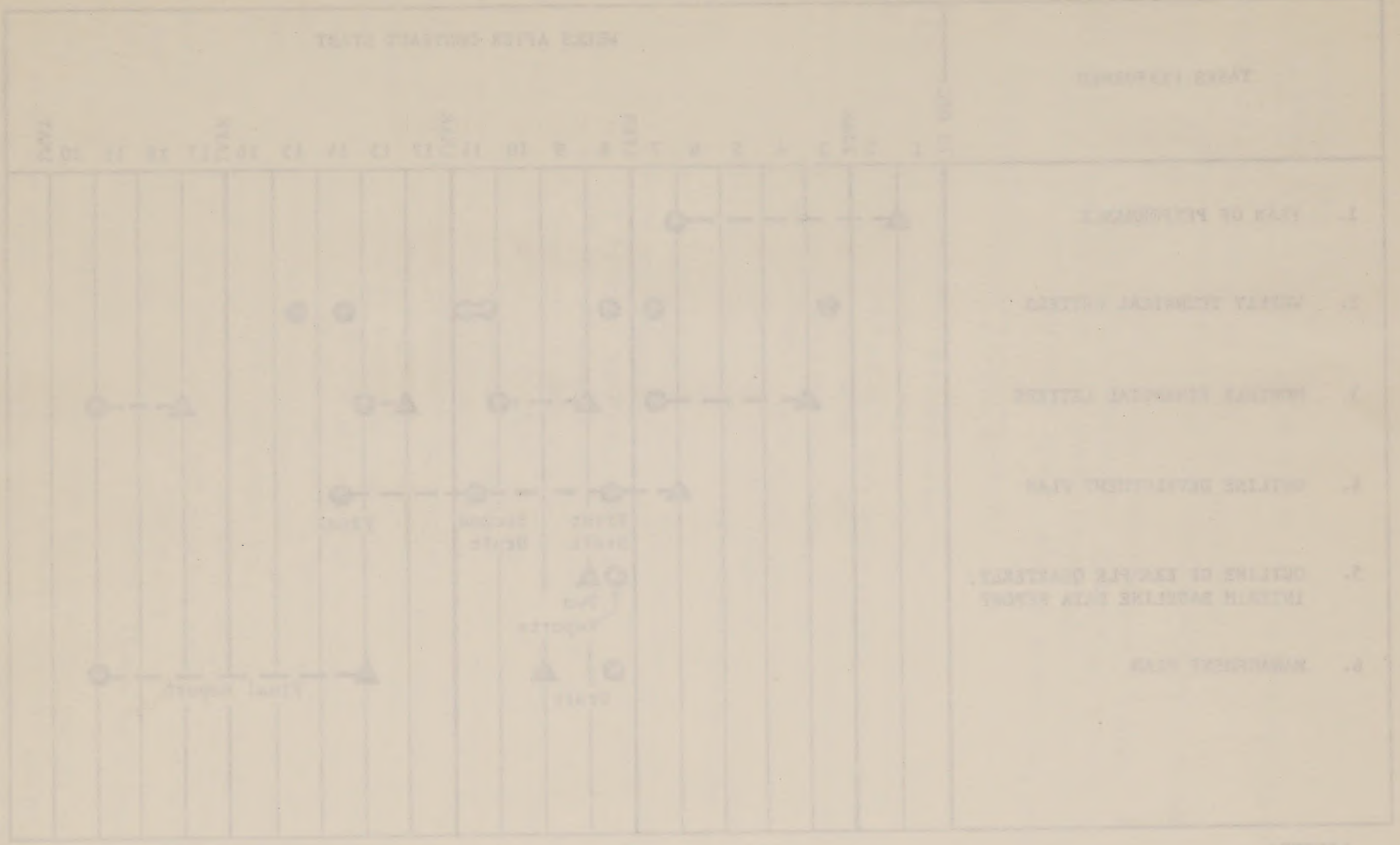
LEGEND:

▲ CONTRACT DUE DATE

● DELIVERY DATE

▲---● SLIPPAGE

FIGURE 3.1
CONTRACTUAL EVENTS



	Budgeted 15 Dec-31 Mar	Expended 15 Dec-31 Mar	Expended 15 Dec-14 Apr
Labor	$48,000.	$40,754.	$48,754.
Overhead	35,100.	37,090.	44,290.
Materials	2,000.	11.	11.
Travel	16,000.	7,355.	8,355.
Consulting	12,300.	10,759.	13,259.
Grand Junction Office	-	4,617.	4,617.
TOTAL	$113,400	$100,586	$119,286.

It is interesting to note that despite the fact that the contract was extended an extra two weeks, labor costs through 31 March were low compared to what had been budgeted in the Plan of Performance ($40,754 vs $48,000). Consulting costs were also less than what had been budgeted ($10,759 vs $12,300), and travel was held down ($7,355 vs $16,000); on the other hand, overhead costs through 31 March exceeded the budgeted amount ($37,000 vs $35,100), and the costs of maintaining an office in Grand Junction had not been considered in the budget ($4,617).

3.5 Detailed Development Plan Outline

A key component of the MITRE proposal was the formulation of an in-depth outline for the Detailed Development Plan (DDP). Based on the proposal, promises were made by the MITRE project team to the Area Oil Shale Supervisor, the Lessees, and the Oil Shale Environmental Advisory Panel concerning the nature and importance of the DDP outline. However, the statement of work in the negotiated contract (officially signed well after the project began) relegated the DDP outline to a less significant role in the management plan. But the Area Oil Shale Supervisor considered the DDP outline crucial for his office, thus the MITRE project team directed its efforts toward the DDP rather than the management plan as a whole.

Using the Prototype Oil Shale Program Lease, 30 CFR 231 and 43 CFR 23 as the main reference sources and the preliminary DDP outlines produced by the Lessees as guidelines, a first draft DDP outline was generated by MITRE.

A meeting was held with the AOSS and his staff to review the DDP outline. A first draft was viewed as a skeleton which needed further expansion, emphasis placed on certain aspects, policy decisions to be made, revisions of particular portions, deletion of financial information, and more annotation to clarify the outlined phrases.

Based on the meeting, a second draft DDP annotated outline was prepared by the MITRE project team. This version was characterized as direct, decisive, and didactic. The original intent had been to give wide distribution to the second draft DDP outline for comment. However, after a quick review of the document, the AOSS chose not to release it, an action which caused some confusion among interested outside parties.

The second draft DDP outline was reviewed by AOSS staff and MITRE personnel. The DDP outline was viewed by the AOSS as, to some degree, too detailed. Furthermore, the AOSS wanted to use the MITRE DDP only for the guidance of the Lessees and a checklist for the AOSS office to use in reviewing the DDP's submitted by the Lessees, but not as the outline the Lessees must follow.

A third draft of the outline was generated by MITRE in order to respond to significant changes requested, and policy decisions enunciated, by the AOSS.

The Denver Research Institute had contributed material about oil shale technology and had suggested a program performance evaluation tool based on the energy balance. The energy balance question was eliminated from the third draft. Another important issue was the inclusion of socio-economic studies in the second draft DDP, but this too was eliminated from the third draft.

A principal MITRE concern with the second draft DDP outline was to give the AOSS sufficient information supplied by the Lessees so that the AOSS's office could develop site specific environmental impact statements should the need arise. This goal was still in mind as well as the comments and views of the AOSS during MITRE's preparation of the third draft.

Two weeks after the second draft had been reviewed the third version of the DDP (see Appendix II-1 of this report) was submitted to the AOSS. During the third week of March the new DDP outline was reviewed by the AOSS office and MITRE personnel. The consensus at that time was that the third draft DDP was adequate and what changes there were to be made would be done by the AOSS's staff. The AOSS also took the responsibility for a selective distribution of the third draft DDP annotated outline.

At this point in time the MITRE project team shifted its efforts to concentrate on the management plan.

Until the third draft of the DDP was submitted, the majority of the MITRE project team's time had been spent on producing an acceptable DDP. Not until the DDP milestone had been reached could the team members devote full-time to the management plan. The third draft DDP set back the timetable to accomplish the project by two weeks for which time an extension was negotiated.

Besides the significant difference in the DDP's role between the contract statement of work and the MITRE proposal and AOSS's opinion, real problems of Lease interpretations and undecided policy decisions also hampered the formulation of a DDP outline by the MITRE project team. Some of these interpretations and policy decisions have yet to be settled and their resolutions can have important bearing on the DDP content.

The selective review process from which comments have been returned to date is composed of the AOSS, his staff, the Lessees, and Oil Shale Environmental Advisory Panel's ad hoc committee, and EPA Region VIII's Office of Energy Activities. Except for the Lessees, the comments and criticisms have been rather minimal; i.e., more references, DDP Appendix Section 15.0 Alternatives should be part of the DDP, not an appendix, Sections 8.0 and 9.0 need to mention conditions spelled out in the EPA workgroup guidelines. The Lessees' major objections stem from the level of detail and specificity called for and the confidential information which is part of the MITRE DDP outline.

3.6 Quarterly Progress Report

As part of the Management Plan for the AOSS, an outline of a quarterly progress report was developed. This quarterly report was requested of each Lessee by the Area Oil Shale Supervisor primarily to convey to the AOSS the predevelopment or baseline environmental data collected by each Lessee.

More than environmental information is contained in a quarterly progress report. Each quarterly progress report is a detailed summary of the headway made during the quarter of all the work, studies, and data collection performed by a Lessee in connection with the prototype oil shale leasing program.

Before The MITRE Corporation received a contract to work with the Area Oil Shale Supervisor, the AOSS designated the seasonal quarters (1 March-31 May, 1 June-31 August, 1 September-30 November, 1 December-28 February) to be the time periods covered by each quarterly progress report. Furthermore, the AOSS left the development of the format of the quarterly progress report up to each Lessee and consequently, three different versions were produced.

The Lessees were directed to make two forms of the quarterly progress report. One would be a full report including all raw data collected, assays, other proprietary information, well logs, etc. The second would simply be a summary version containing no confidential information, only sample tables or charts of the raw data collected, and written synopses of the activities of the Lessee during the quarter.

Tract C-b stated it would outline both reports identically to facilitate cross-referencing (although some portions of the full report would be deleted from the summary version). The MITRE project team felt that this was an excellent approach and recommended that the AOSS make it mandatory of all the Lessees. The MITRE project team further felt that if no standardized quarterly progress report outline was to be imposed upon the Lessees, that the AOSS should require the Lessees to follow their established outlines for every quarterly progress report they submitted. Additions to the outlines could be made but no other changes or deletions would be allowed. This would facilitate cross-checking between a Lessee's reports.

Other suggestions the MITRE project team had for the AOSS were (1) to have each Lessee submit two full quarterly progress reports, one of which does not contain proprietary or confidential information, and (2) that the full reports be submitted in three ring binders to facilitate removal of pages for purposes of copying or review.

By the time MITRE had become involved in the operation of the AOSS's office, the Lessees had submitted proposed outlines of their quarterly progress report formats. The MITRE project team was asked to review these formats and to recommend a suitable format for possible standardization of the quarterly progress report outline.

Based on the Lessee's example outlines and information collected from the AOSS's staff the MITRE project team generated a suggested format for the quarterly progress report. The development of this outline was done simultaneously with that of the DDP. The MITRE quarterly progress report outline was reviewed by the AOSS staff who offered comments on and criticisms of the outline.

Based on the review, a second version was submitted a couple of weeks later. While the main criticisms of the first outline were its degree of detail and the coverage of financial matters, the major objection to the second version was that it was not organized enough like the Colorado Lessee's outlines, particularly with regard to the environmental programs.

Further discussions with the AOSS staff revealed that they were more concerned with outlines of the present Lessees' quarterly progress reports and not as much with a standardized format. However, it was agreed that MITRE's role was to give the AOSS a single, standardized quarterly progress report outline which could be imposed upon new Lessees (from the Wyoming tracts or elsewhere) in the prototype oil shale leasing program if the AOSS so desired.

The third version of the standardized quarterly progress report altered the environmental baseline program section of the outline so that it more closely adhered to that of the Lessees' Exploratory Plans. Other changes modified the core drilling section of the outline by expanding the section with additional components also taken from the Exploratory Plans.

The third version of the quarterly progress report outline was submitted to the AOSS's office during the third week in March. To date no comments or criticisms have been received from the AOSS's staff about the current outline. Therefore, the third version of the quarterly progress report outline was used as Appendix II-2 in Volume II (Guidance for the Lessees) of the Management Plan.

3.7 Environmental Baseline Data Outline/Matrix

One task specified in the contract statement of work necessitated an outline of all the programs and parameters that compose the environmental baseline data for each tract. After the first outline of the quarterly progress report was submitted, part of the MITRE project team developed an outline of the environmental baseline data. The first outline produced a detailed document which lacked a number of the

parameters required by the AOSS letters of approval and added several parameters which were actually additions or options for the Lessees to measure but not required of them. However, the first draft outline was mainly to give the AOSS's staff a sample of how the environmental baseline data outline could be developed.

The MITRE project team and the AOSS's staff agreed that the outline should serve as a checklist for the AOSS's staff specialists to ascertain the extent to which each Lessee had fulfilled the collection of data for the required parameters. Thus, the first outline of the environmental baseline data served its purpose to show the AOSS's staff what could be expected. However, other than stating that parameters were missing and that some extra parameters had been required, the AOSS's office was not too explicit on what parameters appeared to be lacking from the outline.

The second draft of the environmental baseline data outline was generated shortly after the second version of the quarterly progress report outline was submitted. The baseline data outline relied primarily upon the exploratory plans of the Lessees and an integration of the AOSS's letters of approval.

A review of the second version of the environmental baseline data outline revealed that the MITRE project team was on the proper track but several points needed to be clarified. The exploratory plans of the Lessees needed to be reviewed in some instances with the statements of work which their contractors proposed to do. The outline needed some rearrangement and combination of the major sections to bring it more in line with the exploratory plans of the Lessees. A separation of the requirements for each tract had to be done so that it was obvious exactly what each Lessee would do (since they had proposed somewhat different programs).

To ensure that as much information as possible for the environmental baseline data outline was included in the third version, the exploratory plans of each Lessee coupled with any supplemental exploratory plans, statements of work by Lessee contractors, and AOSS letters of approval were outlined. To delineate the differences and similarities between the programs of the Lessees, the notion of an environmental baseline data "outline" was abandoned and the concept of an environmental baseline data "matrix" was substituted. The matrix is formed by six columns: three for the Lessees (C-a, C-b, U-a and U-b) and three for comments or observations about the parameter under the heading of each Lessee (C-a, C-b, U-a / U-b). The rows are generated by the various parameters which come under a particular program. In all, ten programs composed the matrix: Air Quality, Meteorology; Water Quality and Hydrology, Surface Water; Water Quality and Hydrology, Ground Water; Biology; Soil; Noise; Seismicity; Archeology, Historic and Cultural Values; and Aesthetics and Scenic Values.

If a Lessee is to perform or measure a parameter, the source which requires the Lessee do the task is listed in the appropriate location on the matrix.

The completed environmental baseline data matrix was submitted to the AOSS as Appendix II-3 in Volume II (Guidance for the Lessees) of the Management Plan. The AOSS's staff comment about the matrix was that it was a very helpful document.

One major problem still exists with identifying parameters. The AOSS letters of approval and the exploratory plans sometimes are not clear on precisely what parameters are to be measured and sometimes offer conflicting views about the parameters. The AOSS's office has stated that they are about to review each program of each Lessee and sttempt to straighten out apparent inconsistencies and vague parameters. Since this could alter the matrix as it presently exists, the AOSS's staff must change the parameter as necessary.

3.8 Management Plan

The major obstacle that prevented a timely completion of the Management Plan was the additional effort expended to complete the final form of the Detailed Development Plan outline. The DDP preparation continued until 17 March 1975 and consequently MITRE staff was unable to devote full attention to drafting a Management Plan until 24 March 1975. At that time it was estimated that three to four weeks would be required to organize and submit a draft Management Plan. The MITRE contract with the Geological Survey was scheduled to end on 31 March 1975. To alleviate this scheduling problem the GS extended the contract expiration date to 14 April 1975. The extra time provided by this extension was partially offset by MITRE staff vacations planned according to the original contract termination date and by the vacation of MITRE consultant David Dominick.* In spite of these circumstances, a draft Management Plan was submitted by MITRE staff to the AOSS office on April 7, 1975. The purpose of the document was to expedite the final approval of baseline data presentation and development of Detailed Development Plans. To achieve this, the Management Plan** provided the AOSS with:

1. A Management-by-Objectives process that identifies program objectives and goals and presents procedures the AOSS should employ to achieve them;
2. A Master Milestone Schedule detailing the baseline data and DDP approval process;
3. Program planning and budgeting tools;
4. Schedules of meetings between the AOSS and his staff and agendas for these meetings;

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* Refer to "Weekly Technical Letter", 27 March 1975, from G. Haas to P. Rutledge.

**Management Plan - Volume I (Appendix I), and Volume II, Guidance for the Lessees (Appendix II).

5. Communication paths, schedules, and procedures for coordination between the AOSS and the Lessees, the OSEAP, EPA, and other public and private agencies or groups with interest in the prototype oil shale program;
6. A data management system;
7. An information control system;
8. A compendium of legal requirements related to the prototype programs;
9. External review processes; and
10. Recommended environmental monitoring programs for air, water and biology.

The AOSS and his staff reviewed the draft Management Plan and on 22 April 1975 sent their comments and recommendation for the final Management Plan back to MITRE. Since the end of the reviewed contract expiration date (14 April 1975), MITRE has been operating with corporate overhead money to prepare an acceptable document. MITRE staff involved with the preparation of the final Management Plan and Final Report were: James Clark, Mark Doherty, Greg Haas and Howard Williams. Consultant David Dominick also participated in the final review of these documents.

It is believed that a more directive Management Plan could have been prepared had more time been available to better understand the idiosyncrasies of the AOSS office and of the prototype program. But perhaps the more binding constraint was the uniqueness of the prototype program. It was difficult to prescribe management procedures for tasks that will be performed for the first time.

3.9 Final Report

MITRE, in accordance with the contract, prepared the Final Report. This Report is intended for the personal use and benefit of AOSS and his key staff. It candidly discusses the negative and positive results of the contract activities and includes recommendations and conclusions based on the experience mutually obtained between the AOSS and MITRE staff.

3.10 Internal Documentation

In the course of its work on the contract, the MITRE project team and its consultants generated a number of memos for internal guidance purposes. Described below are some of the more important memos written. For a complete listing see Appendix V.

3.10.1 Memo No. D50-M230, Major Policy Issues Posed by the Prototype Oil Shale Leasing Program, 30 January 1975

As the title implies, this document discusses a number of issues to be considered by the Area Oil Shale Mining Supervisor in the formulation of the final requirements for the Detailed Development Plan.

Under the major sections entitled Water Quality, Water Supply, Ambient Air, Emission Standards, Indirect Source Regulations, Transportation Corridors, Spent Shale Disposal Sites, BLM/USGS Jurisdictional Interface, Colorado Wildlife Exchange Problem, Utah - In Lieu Lands State Suit, NEPA Requirements, Federal Preemption, Lease Interpretations, State and County Approval of the DDP, and other factors to be considered in the formulation of DDP requirements.

As an example of the treatment given the many issues addressed, the subject of Injection Wells is raised. Under this topic, the jurisdictional problem in Colorado over the regulatory authorities vested in the Office of the State Engineer, the Office of the State Geologist, and the Water Quality Control Commission is described. Aside from this issue, the design of reinjection wells to insure that interconnections between acquifers and surface waters are inhibited is described. As another example, the problem with the availability of water for the Utah Lessees is discussed. It appears that the White River allocations may not be being put to beneficial use and that sufficient water may be available for reservoir storage for the Lessee. The potential for suits by present appropriators including Indians on a nearby reservation could be a serious obstacle to acquisition of these water rights (this material was forwarded to the Area Oil Shale Supervisor in substantially the same form per Letter D50-240 Policy Issue 7 February 1975).

3.10.2 Memo No. D51-M308, Potential Production Rate Error in Prototype Oil Shale Leases, 5 March 1975

This memo illuminates a conflict between the production rate schedule to be imposed upon the Lessees according to the notice of the lease sales appearing in the Federal Register (30 November 1973, Volume 38, No. 230) and the leases that were actually signed. According to the latter, production rates are off by a factor of 1,000 from what had been intended. This becomes significant when one considers that minimum lease royalties are based upon these production rates. It is recommended that the Oil Shale Supervisor be notified of this inconsistency (this was accomplished by Letter D50-285 dated 17 March 1975).

3.10.3 Memo No. D51-M311, Due Diligence Aspects in the Prototype Oil Shale Program, 6 March 1975

This document presents a rationale for expanding upon the meaning of "due diligence" and outlines a means for specifying how an oil shale Lessee must meet the due diligence requirement of the DDP. Two time frames are considered - development and production. It was suggested that the Lessee describe in the DDP how his development team is to be organized, identify key personnel, describe the specialized skills and services to be acquired, and describe how technical data will be stored/reviewed and so on.

4.0 ORGANIZATIONAL INTERFACES

This section addresses the meetings and discussions the MITRE project team had with various parties. Because there were numerous contacts made during the course of this project, only the more significant interfaces are discussed.

Table 4.1 summarizes the organizational interfaces which occurred. The date, participants, location, subjects and accomplishments of each interaction are described. The participants column does not list the project team unless only one or two team members attended a meeting, in which case the team members' names are listed and underlined.

4.1 Area Oil Shale Supervisor (AOSS)

The MITRE project team first met the AOSS and his staff on the sixth of January at a meeting with the Lessees. During the following week the MITRE project team and the AOSS's staff discussed the oil shale project, the AOSS's office functions, and the routines of the AOSS's staff. Though much was learned from this, it also became obvious that the AOSS's staff were not too certain as to their own roles, due primarily to the newness of both the office and the staff.

Throughout the duration of the contract, the MITRE project team maintained a field office in Grand Junction, Colorado. This facilitated communication with and review of products by the AOSS. Special meetings were held to review the drafts of the DDP. Project team members also accompanied the AOSS's staff to monthly progress meetings, Oil Shale Environmental Advisory Panel meetings, and on-tract inspections. Numerous discussions and meetings were held with the AOSS's office developing a good working relationship.

4.2 Bureau of Land Management (BLM)

The contact between the BLM and the MITRE project team was limited to the monthly coordination meetings and an on-site inspection. In each instance the interaction was minimal. The project team would occasionally ask questions of the BLM personnel but only to inquire about their part in the prototype oil shale leasing program.

4.3 Oil Shale Environmental Advisory Panel (OSEAP)

The interface between the OSEAP and the MITRE project team was mainly through the AOSS. The project team attended the January and March meetings of the advisory panel and an ad hoc committee of the OSEAP reviewed the third draft of the MITRE Detailed Development Plan outline. (According to the committee comments it appears that they wanted to include a few items which had been in the second draft DDP outline.)

The project team felt that the MITRE-OSEAP interface could have been developed to a higher degree and perhaps, could have resulted in a broader scope of inputs for the DDP outline and management plan.

ORGANIZATIONAL INTERFACES

Meeting Date	Interaction	Participants	Location	Subjects & Accomplishments
Jan. 5	Meeting	Haas, AOSS	Denver	Meet AOSS
Jan. 6	Meetings	AOSS & staff, BLM, Lessees & Lessees' consultants	Denver	Familiarize with Lessees
Jan. 6	Discussion	Doherty*, Colorado Committee on Oil Shale Environmental Problems	Denver	Hear reports on oil shale development
Jan. 7	Meetings	AOSS, John Lohrenz (USES)	Denver	ADP possibilities
Jan. 7	Meeting	Doherty, John Rold (Colorado State Geologist)	Denver	Discuss Oil Shale development in Colorado
Jan. 7,8	Interaction	AOSS staff	Grand Junction	AOSS files, data, information retrieval methods
Jan. 9,10	Meeting	AOSS, USEAP	Denver	Monthly meeting, familiarize, introduce MITRE
Jan. 10	Meeting	Cameron Engineers	Denver	Compare and discuss paths for DDP
		Summary - Establish office, introduce MITRE, meet other participants, clarify and deliniate nature and requirements of the management plan.		
		Problems - 1. How much detail will be required in DDP 2. Time required for identification of permits and licenses.		
Jan.20-24	Interaction	Antizzo - AOSS staff	Grand Junction	Requirements & approaches for data & exploratory plan for the program
Jan.20-24	Interaction	Doherty - AOSS	Grand Junction	Data requirements & quarterly report.
Jan.21-23	Interaction and Meeting	Williams & Dominick**, Lessees and state & local government officials	Denver and Salt Lake City	License requirements, local reqs., impact upon DDP.
		Summary - Determine external requirements and coordination. Problems - Extraction of data from contractors and Lessees		
Feb. 5	Meeting	Doherty, U-a, U-b, AOSSO, BLM	Vernal, Utah	Monthly coordination meeting
Feb. 5	Meeting and Tract Inspection	Doherty, AOSSO, BLM, GSA	Colorado Tracts	On-site visit and inspection
Feb. 9	Meeting	MITRE & Dominick, C-a & C-b	Denver	Discussion of DDP
Feb.10	Meeting	C-a, C-b, AOSSO & BLM	Denver	Monthly coordination meeting
Feb.11	Meeting	AOSS and staff	Grand Junction	Review of submissions & clarification of DDP outline requirements
Feb.12	Meeting	MITRE & Dominick, DRI	Denver	Technical aspects of DDP
Feb.12	Meeting	C-b Lessees	Denver	DDP outline
Feb.12	Meeting	OSEAP	Salt Lake City	Monthly meeting
		Summary - Information gathered, learned of the Lessees' ideas about oil shale program, and began to review MITRE documents		
		Problems - 1. Structure of DDP at variance between MITRE and C-b. C-a O.K., Utah - non-commital.		
Feb.26-28	Meetings and Interactions	Doherty and AOSS		Meeting on DDP outline (second draft)
March 19,20	Meeting	MITRE & Dominick, AOSS		DDP outline (third draft)
March 24-25	Meeting	Antizzo, AOSS		Problems in Exploratory Plan and data requirements.
		Summary - 1. DDP outline too strict, delatiled, decisive - rewrite as a guideline 2. Policy issues needing resolution 3. Exploratory Plans & AOSS letters of approval unclear in cases 4. Third draft DDP needs only minor changes by AOSS		
April 8-11	Meetings and Interactions	Doherty, AOSS and staff		Review management plan
		Summary -		
		Problem - 1. Revisions needed in management plan		

*Underlined name refers to particular MITRE project team member.
If no underlined name appears all or most of the project team was involved.

**Consultant to The MITRE Corporation

4.4 Lessees

Throughout the course of the contract, the MITRE project team interfaced formally and informally with both the Lessees and their contractors in various locations and situations. The monthly coordination meetings gave the project team an opportunity to work with the AOSS and the Lessees. These meetings also allowed the team to understand the positions and attitudes of the Lessees (C-a: careful, deliberate, and willing to ease through situations. C-b: aggressive, blunt, and already decided upon their course of action regardless. U-a/U-b: noncommittal, careful, wait-and-see, follow what has worked successfully for C-a and C-b.)

The project team interfaced with the consultants/contractors of the Lessees. In this way the project team could find out exactly what was occuring on the tracts, what were the details of the activities both ongoing and planned, what interpretations existed of the lease, regulations, etc., and what their reactions were to the MITRE proposals for and interpretations of the prototype program and legal obligations.

4.5 EPA

MITRE personnel and consultants met with EPA officials on at least two separate occasions in January and February for the purpose of discussing federal pollution control regulations requiring compliance by Lessees in the development and proposed operation of their tracts. Cognizance of these regulatory requirements was an essential ingredient in MITRE's drafting of the proposed DDP Guidelines.

EPA regional personnel consulted included:

John A. Green, Regional Administrator, Revion VIII
Cooper Wayman, Director of Energy Programs
Bob Hagen, Assistant Director of Energy Programs
Irv Dickstein, Director of Enforcement Division
Evan Dildin, Director of Permit Programs
Richard Andrews, Attorney in the Office of Enforcement and Oil Pollution Control

These meetings were extremely productive. Information and materials were readily forthcoming and were used extensively in applicable portions of the Management Plan.*

From an operational point of view, it is recommended that the AOSS, the Chairman of the OSEAP and the Regional Administrator of EPA Region VIII, establish procedures by which information on the program relevant to the responsibilities of their respective offices can be exchanged, and discussed on an informal basis. These would be in addition to those occurring during the Panel meetings. Such exchanges and discussions would occur on an ad hoc basis as progress on the program dictates.

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* See Appendices I-2 and I-5 of the Management Plan, Volume I, entitled Regulations, Laws, Licenses and Permits and Requirements Imposed by the Lease, respectively.

4.6 State Agencies

4.6.1 Colorado

MITRE personnel and their consultant met with a large number of Colorado agency personnel, including:

Mr. Bob Siek, Assistant Director, Division of Environmental Health, Colorado Department of Health
Mr. Ace Bischard, Director of Air Quality Control Programs
Mr. Pete Barrows, Chief, Environmental Resources, Colorado Division of Wildlife, Department of Natural Resources
Staff of the Office of the State Geologist, Colorado Department of Natural Resources

Again, relevant and significant information concerning State regulatory requirements - particularly with respect to air quality regulations, present and proposed - were made readily available.

As will be discussed in a later section of this final report (Section 5.7, Future Oil Shale Leasing Activities), the air quality requirements of the State of Colorado are in a state of considerable flux and uncertainty. Direct liaison, on an as-needed basis, between AOSS staff and the Colorado Division of Environmental Health (Mr. Bob Siek and his staff) is recommended.

4.6.2 Utah

Contacts between MITRE project personnel and State of Utah environmental and natural resource officials were more limited than those experienced in Colorado due to a number of factors, most notably scheduling problems, limited availability of Utah staff, and the fact that there appeared to be a few significant problems of a state environmental regulatory nature in Utah.

A meeting was held with Mr. Alvin B. Rickers, Assistant Chief, Air Quality Section, Bureau of Environmental Health, Utah Department of Social Services. Mr. Rickers provided the MITRE project team with information and materials that addressed current and contemplated Utah air quality requirements. In addition, MITRE met with members of the Utah Bureau of Solid Waste to discuss mined-land reclamation requirements which might be proposed for the future.

The contacts with Utah were considered satisfactory and no significant inter-governmental problems with the State of Utah are foreseen.

4.7 Denver Research Institute

Extensive use of Denver Research Institute was made through a subcontract arrangement by MITRE in the development of the DDP Guidelines. Dr. Charles H. Prien, Senior Research Fellow, Chemical Division, DRI, served as the principal point of contact.

Discussions of the socio-economic aspects and growth management needs associated with western slope oil shale development were held. Insights on county government capabilities and regulatory requirements were important topics discussed in some detail. In addition, the MITRE team reviewed the most recent results of the Gilmore study* of local government response to the boom phenomena in Sweetwater County, Wyoming.

Finally, Mr. John Carver, Professor of Natural Resources Law at the University of Denver Law School provided one half day's assistance in preparing the water requirements section of the DDP Guidelines.

In sum, DRI and its senior personnel served admirably to assist MITRE on critical portions of its work.

4.8 Other Interested Groups

As was indicated above, considerable insight into local and county organizations was obtained through discussions with Lessees, state officials and DRI personnel.

In addition, the OSEAP meetings and direct informal discussions with Panel members provided MITRE with an understanding of the concerns, attitudes and positions of public interest and/or environmental groups with respect to the prototype leasing program. The Planning Department of Rio Blanco County, Meeker, Colorado, provided a notebook containing all County Ordinances adopted through 31 January 1975. Although the issue of state and local jurisdiction over the activities of operators on federal lands has not been resolved, appropriate references to county regulations that may impact on the program are contained in Appendix I-2, Regulations, Laws, Licenses and Permits, of the Management Plan Volume I.

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* John Gilmore, Denver Research Institute.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 AOSS Program Management Procedures

A. Conclusions

Observations of the AOSS office operations and discussions with AOSS staff revealed the following organizational characteristics of the AOSS office:

1. A management-by-objective process informally applied. Evaluation criteria for program progress and staff performance have not been established and documented.
2. Delegation of authority is loosely defined: too much authority is vested in specialists and the AOSS; not enough in the tract coordinators.
3. External signs of well-defined program planning and budgeting are lacking. Potential problems are inadequately addressed.
4. Excellent team attitude among the staff has been developed, but there is an over-reliance on it to resolve problem situations.

An examination of the schedule the AOSS must adhere to, if the program tasks are to be completed indicated that 1976 and 1977 will be critical years for the AOSS office. Review and evaluation of environmental baseline data reports compiled with the continuous approval process of the three Detailed Development Plans will strain the capacity of the AOSS staff to perform their regular functions. It seems quite likely that during this period scheduling crises will occur and the completion of one task might have to suffer for the completion of another task. But nowhere has an analysis been done to predict when these critical periods might occur and how the AOSS can minimize their disruptive effect on the prototype oil shale program.

B. Recommendations

MITRE sought to build upon the organizational foundation of the AOSS office and develop management procedures that could correct its organizational short-comings and prepare it to predict, confront, and perhaps overcome future scheduling problems.

The management procedures are presented in four parts, all of which, if taken together, form an integrated process the AOSS should implement. The four procedures are:

1. Identify all tasks to be completed over a time period,*
2. Develop an Accomplishment Plan,

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* The time period could be a calendar or fiscal year or the Pre-Development Phase time period.

3. Implement a Management-by-Objectives (MBO) process, and
4. Develop management aids to facilitate the program operations.

MITRE has identified the Pre-Development Phase program tasks and organized them into several Master Milestone schedules and summaries. Next, AOSS staff time is allocated to each task as required and when required man-weeks are compared to budgeted (i.e., available) man-weeks, the AOSS can ascertain when the office can expect a scheduling crisis. This analysis is called an Accomplishment Plan and can be used to estimate and justify budgets, delegate authority and responsibility, and evaluate and direct program progress and staff performance.

The third procedure presented is a management-by-objectives process. It forces the AOSS to document the delegation of authority and to establish review and evaluation criteria for program progress and staff performance. An MBO process is a logical choice because most of the process is completed by the first and second procedures.

Finally, the fourth procedure provides the AOSS with documentation of past, present, and future program activities for both internal program control and to explain his operation to outside parties.

5.2 Monitoring of Lessee Performance

Because of insufficient staff, the operations of the AOSS office have been severely hampered until several months ago. Since December 1974, the number of environmental engineering specialists has increased from three to eight. This increase occurred at the onset of the MITRE contract so that what is discussed here must be taken in that context, namely, that the Oil Shale Supervisor has already put into motion methods of improving the way his office monitors Lessee performance.

5.2.1 Knowledge of Requirements

The requirements which define Lessee performance are contained in the Lease, a multitude of federal, state and local regulations, Exploration Plans submitted by each Lessee, and a series of AOSS directives to each Lessee (in letter form). Assembling definitive lists of requirements for each Lessee from this material is a very sizeable task, even assuming an adequate staff. The Leases are very complicated documents; the Environmental Stipulations section alone takes up five of the ten pages of the Lease Notice in the Federal Register.* Although the Leases identify key federal regulations** the task of identifying all other governmental regulations (federal, state and local) that have an impact on the prototype oil shale leasing program is also a time-consuming task; the Oil Shale Supervisor recognized this problem early in the program and this became a significant task contracted out to MITRE.

*Vol. 30, No. 230, Friday, November 30, 1973.
**30 CFR 231, 43 CFR 23.

The Exploration Plans were submitted to the AOSS for review in the late spring of 1974. Despite a limited staff of specialists in his office, the AOSS began a very comprehensive analysis of the contents of each Plan using the Lease terms and conditions as authority. To expedite matters, Plans have been accepted on a section basis. This process involved the writing of a series of letters informing a Lessee that if the Plan was to incorporate the specifics recommended by the AOSS, that portion of the Plan would be approved. Each Lessee received about four or five letters (directives) in this regard. As of 31 March 1975, there are still some portions of each Plan remaining to be approved; these are relatively minor in nature (see Table 5.2 in Appendix I, the Management Plan, Volume I).

B. Conclusions

Without the use of consultants or by greatly expanding his staff, the Oil Shale Supervisor faced an impossible task of identifying prototype program requirements specified in the Leases and applicable governmental regulations. During the first six months of the program, the AOSS was forced to rely on the Lessees to identify the requirements as they prepared their Exploration Plans and their Detailed Development Plans. By cross-checking the three Exploration Plans submitted, the AOSS was able to identify requirements as contained in the Leases. He did not, however, attempt to assemble these requirements into a master list that could then be levied as a package upon the Lessees.

With regard to governmental regulations, the AOSS attempted to gather them on a limited basis. For example, he did not attempt to compile a list of the licenses and permits Colorado and Utah require of companies like the Lessees.

Finally, the AOSS did not request the Lessees to modify the Exploration Plans in accordance with his letters of approval. Consequently, Plan requirements consist of many separate pieces of paper, making it difficult for one to determine just what is the controlling document for Lessee exploratory efforts. The fact that the Plans were submitted with varying formats further compounds the problem of generating a master list of requirements during this stage of program operations.

C. Recommendations

The AOSS should utilize the following material which has been generated by MITRE to help codify Lessee performance requirements:

1) Appendix I-2 of the Management Plan, Volume I. This contains a compilation of the regulations, laws, permits and licenses that impact on the Lessees.

2) Appendix I-3 of the Management Plan, Volume I. This is an outline of an oil shale lease. It presents the Environmental Stipulations in a convenient tabular form.

3) Appendix I, the Management Plan, Volume I, Section 5.0. This summarizes all the plans, reports and inspections imposed by the Leases 30 CFR 231, 43 CFR 23, and 615DM3*. The material includes documents and inspections that pertain to the AOSS, BLM and the Oil Shale Environmental Advisory Panel, as well as the Lessees.

4) Appendix IV of this Final Report. This is a listing of all regulations and laws collected by MITRE and used in the process of its work on the contract. Because of the magnitude of the documentation involved, copies of this material havenot been included in this report.

5.2.2 Review of Lessee Document Submissions

A. Discussion

Prior to 1 January 1975 the only documents submitted to the AOSS were the three Exploration Plans in the spring of 1974.. The AOSS concentrated what staff he had upon reviewing these documents as discussed in Section 5.1.1 above. Since 1 January, the Lessees have submitted two Quarterly Progress Reports each. These reports were each submitted in two parts, one containing detailed baseline data and exploratory data, and the second containing a summary of these data as well as activities of the Lessee for the period involved. With the increase in his staff, the AOSS has been able to assign portions of these submissions for review. These reports do not have to be approved so a detailed review is not involved. To compound the problem, three of the staff environmental specialists have the added duty of coordinating overall AOSS activities for a given Lease.

B. Conclusions

The workload imposed on the AOSS staff to review Lessee documents has not been excessive to date because the submissions have just begun. As soon as the Lessees have begun to input the Quarterly Reports, Annual Reports, Baseline Data Reports and Detailed Development Plans the workload should become excessive if existing review procedures continue in effect.

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*615DM3 is the DOI Departmental Manual which addresses responsibilities of the OSEAP under the Prototype Oil Shale Leasing Program.

The AOSS does not rely enough on environmental specialists in local, federal and state agencies for support. In addition, members of the OSEAP do not appear to be relied upon (outside of their Panel activities) for direct support of the AOSS. These people (or their organizations) could supplement the AOSS staff in areas which require specialized fields of expertise.

C. Recommendations

The AOSS should implement the procedures discussed in Section 4 of the Management Plan* for maintaining control of the prototype program.

The AOSS should utilize whatever resources can be made available to him from federal and state agencies to review Lessee performance.

The AOSS should clarify the duties and responsibilities of a tract coordinator and an environmental engineering specialist. When the same individual fills both positions it is inevitable that a conflict of priorities will arise. It is recommended that the positions be made distinct with coordinators acting as consultants in the fields of their specialties. This implies that the AOSS must increase his staff or (following the recommendation above) rely heavily on other agency support.

5.3 Interfaces with Other Organizations

5.3.1 Interfaces with the OSEAP

A. Discussion

During the course of the contract MITRE personnel and consultants attended two full-scale meetings of the Oil Shale Environmental Advisory Panel (OSEAP), the first in Denver (9, 10 January) and the second in Salt Lake City (13, 14 March). The Area Oil Shale Supervisor (AOSS) and members of his staff also attended, participated actively in the deliberations of the Panel and made formal presentations. About 125 persons attend a typical Panel meeting. In addition to the AOSS staff, personnel from the BLM District Managers office, and the 32 members of the Panel, those attending usually include from five to ten representatives of each of the three Lessees, and an audience of observers from a variety of federal, state and local government agencies and citizens groups.

*Appendix I

Panel deliberations are scheduled for one and one-half days. The meeting agenda is set by the Panel Chairman in coordination with the Area Oil Shale Supervisor. Usually the first full day is spent on presentations by the AOSS, BLM District Managers, and each of the Lessees. As time permits, there are briefings on a variety of topics of interest to the Panel and the audience; for example, at the January meeting briefings were given on oil shale mining and in situ development research conducted at the Bureau of Mines Denver Research Center, the Colorado Piceance Basin Water Resources Project, and the Oil Shale Geology and Resources Assessment Program of the USGS Geologic Division.

The Oil Shale Supervisor plays a major role at the Panel meetings not only by responding to questions from the Panel about specific environmental issues concerning the prototype program, but also by amplifying remarks made by the Lessees during their presentations. With regard to the Lessee presentations, the Oil Shale Supervisor makes it a practice to discuss with each Lessee well before the meeting the form and substance of each presentation.

Panel members not only participate in the formal Panel meetings but they also work on special projects assigned by the Chairman. These projects usually arise to help some issue raised by the AOSS. For example, the OSEAP was requested by the AOSS to review the Draft DDP Guidelines, as prepared by MITRE, and to forward their comments to the AOSS. The Chairman of OSEAP appointed an Ad Hoc Review Committee to perform this task.

B. Conclusions

Observations based upon these contacts with the OSEAP lead us to conclude the following:

1) That the OSEAP was well conceived, is well managed, and appears to be fulfilling its stated mandate.

2) That it is serving a vital function in the context of the overall Prototype Leasing Program by providing a mechanism for public and other government agency review, discussion, and advice on the critical environmental aspects of the lease program.

3) That the AOSS enjoys a good working relationship with the OSEAP and its Chairman.

4) That the AOSS and his staff have made effective and good faith efforts to provide the OSEAP with significant environmental information in a timely manner and have sought advice from the OSEAP in a manner consonant with its charter.

C. Recommendations

1) The Secretary of the Interior should renew the charter of the OSEAP for a period of two years when the present life of the Panel expires on or before December 31, 1975.

2) In the event that DDPs are approved on all tracts and that development and operations commence, the OSEAP should determine whether meetings should be held less frequently than at present.

5.3.2 Interfaces with Federal, State and Local Organizations

A. Discussion

Observations by MITRE project personnel would indicate that the AOSS and his staff have had occasion to interface with other federal, state and local organizations on an "as needed" basis. These interactions have taken place in at least three ways:

1) Informal person-to-person interactions with officials of other interested organizations and agencies;

2) Interactions between Lessees and other interested organizations and agencies, and information concerning the nature of these contacts is subsequently passed on to the AOSS and his staff; and

3) Through the OSEAP.

Of these three ways the use of the third, or OSEAP mechanism, is the most consistent and effective means available for interaction at the present time. The AOSS has also apparently limited his initiative to interactions with other federal, state and local organizations to "matters relating to the supervision of operations"* of the Prototype Leasing Program and has refrained from soliciting involvement from other federal, state or local organizations on matters peripheral to tract development, such as regional environmental impact or the socio-economic impacts of shale development in affected areas.

Finally, while personal relations between USGS and BLM field personnel remain cordial, USGS personnel in the office of the AOSS expressed continuing concern about the uneven application of Secretarial Order 2948 to the respective agencies.

*Secretarial Order 2948, October 6, 1972, Section 2(c)(2).

B. Conclusions

1) The AOSS and his staff appear to have sufficient interaction with other federal, state and local organizations for the purpose of raising and resolving administrative problems connected with the conduct of the prototype program.

2) Policy problems, if they occur, will require interface mechanisms at a higher level than the AOSS.

3) The OSEAP serves as an excellent mechanism for other organization and agency interfaces.

C. Recommendations

1) That the Secretary require uniform adoption of Secretarial Order 2948 by all agencies and that if ambiguities are discovered in the implementation of that directive, that such ambiguities be clarified by a revised Secretarial Order.

2) That the AOSS consider whether increased federal involvement under the leadership of either the AOSS or the Chairman of the OSEAP is warranted at this time to deal with such matters as socio-economic impact and regional environmental impact. If so, interagency efforts by federal, state, and local agencies would clearly be appropriate and would require the development of new interagency coordination mechanisms.

5.3.3 Interfaces with Environmental Groups

A. Discussion

The principal means of interaction with environmental groups witnessed by MITRE project personnel were:

1) Speeches and appearances before public groups by the AOSS and key members of his staff.

2) Distribution of Quarterly Reports and other key information items to local libraries for full public access.

3) The regular meetings of the OSEAP.

B. Conclusions

1) Interactions with the environmental groups will become more urgently required at the time of the DDP submissions, reviews and approvals. A public hearing on the environmental provisions of submitted DDPs is presently scheduled by the AOSS.

2) The OSEAP offers an excellent mechanism for continuing environmental group interaction with the Prototype Leasing Program.

C. Recommendations

1) That the AOSS remain sensitive to the need for keeping the general public and interested environmental groups apprised on a timely basis of significant decisions and issues during the progress of the prototype program.

2) That the AOSS proceed to schedule public hearings on the environmental provisions of the DDPs as they are submitted for approval.

3) That the OSEAP continue to serve as the primary focus for environmental interest group participation in the prototype program.

5.4 Public Relations Efforts

The Area Oil Shale Supervisor, like other key government officials, has responsibilities to two sectors - to his superiors and associates in the Department of the Interior and to the public. Departmental rules of procedure guide the Supervisor in keeping his governmental superiors and associates alerted to prototype program developments. This section addresses how he should keep the public in general and concerned citizen groups in particular alerted to these same developments.

5.4.1 Citizenry-Oriented Public Relations

A. Discussion

The AOSS currently responds to media requests for interviews concerning what his job is, what the prototype program is, how his office operates, and who the major participants in the leasing program are.*

*Per Order No. 2948, Office of the Secretary

The AOSS also participates in a variety of professional meetings as a speaker or panelist and in this way describes the prototype program to his colleagues in industry and government. Until the Leases were signed last spring, the BLM exercised the Secretary's discretionary authority with regard to whether the oil shale leases were to be issued; once the BLM issued the Lease the GS - through the AOSS - became responsible for all geologic, engineering and economic value determinations for the Department.* Thus, the public properly looks to the AOSS for official information about the program.

B. Conclusions

The Oil Shale Supervisor reports regularly on program progress to the media and to his professional colleagues. It is not clear that the former are initiated by his office, however.

It appears that the public cannot presently depend upon the issuance of progress reports on a regular basis on the prototype program except through media coverage of the OSEAP meetings or by attendance at these meetings when they are held locally.

C. Recommendations

The Oil Shale Supervisor should submit a progress report to a variety of local newspapers, highlighting key issues, developments, and so on.

This same progress report should also be distributed to key offices in governmental agencies and to County libraries.

5.4.2 Environmental Community-Oriented Public Relations**

A. Discussion

As mentioned in Section 5.4.1 above, the AOSS is a frequent guest at professional meetings. The technical community is thus able to keep abreast of oil shale development. It is not known how many speaking engagements the AOSS has fulfilled before private groups like men's and women's clubs, Kiwanis Clubs, Sierra Clubs, Friends of the Earth, Audubon Societies, etc. It is expected that any requests that do come in in this vein are satisfied by the AOSS personnally if he has the time.

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*Per Order No. 2948, Office of the Secretary
**See also Section 5.3.3 above.

There are at least two members of the OSEAP that represent environmental groups - one appointed by the Governor of Utah, one by the Governor of Colorado. These persons can be relied upon to keep the groups they represent well informed. It is not clear how regular their reports to those groups may be or how well informed the members are about general aspects of program progress.

B. Conclusions

Private environmental groups have limited access to the AOSS on an informal give-and-take type basis.

The AOSS is not able to personally fulfill all requests that could be made for him to speak.

C. Recommendations

The AOSS should solicit speaking engagements from amongst local environmental groups to insure that the program gets as broad coverage in this area as possible.

In addition he should encourage his staff, especially the Tract Coordinators, to solicit speaking engagements with environmental groups that are interested in specific tracts.

5.5 Ability of the AOSSO to Keep Pace with Changes and Innovations - Technical, Regulatory, Data Processing and Statistical

It will be exceedingly difficult for the AOSS and his staff to keep pace with the great mass of pertinent regulations, technical publications and accumulated data. Because of the great amount of work and limited number of staff, it is recommended that the AOSS emphasize standardization of formats and procedures for repetitive tasks and utilize external support systems whenever possible.

Standardization of formats and procedures offer several benefits: minimize time requirements per initiation of new personnel; reduce time required for preparation and/or analysis of reports; facilitate correlation and comparison of reports and procedures; minimize discrepancies, ambiguities and uncertainties among staff members and external personnel; and facilitate definition of problem areas and bottle-necks. It should be noted, of course, that not all operations of the office can be readily standardized; some tasks will require ad hoc groups of specialists. However, many other tasks to be performed by the AOSS Office are essentially repetitive and lend themselves to standardization, i.e., data processing, ordering of publications and organization of the library. Procedures for these tasks should be developed by specialists in each area; flexibility must be built-in to allow changes in procedures and practices when necessary. Standardization of procedures and formats should not be limited to the initial functions of the AOSS office; it should also extend to guidelines for other interested

parties, i.e. Lessees. While it is recognized that each of the Lessees "should not be forced through the same keyhole" it should also be recognized that failure to provide guidance for standardization of reports and data input will probably overload the AOSS office and make adequate data analysis very difficult, if not impossible.

Utilization of external support sources is the second key feature of any attempt to keep the AOSS and his staff up-to-date. Among the prime sources of direct support are Clipping Services and Automatic Data Processing Services. Clipping services will scan thousands of magazines and journals and hundreds of newspapers on a key-word-basis to enable the office to keep abreast of technical advances, changes in regulations and public sentiment without increasing the workload of the staff. The fee for their services are nominal, i.e., Bacon's Clipping Service in Chicago scans 4000 magazines and journals and 700 newspapers for a fee of $50/month and $0.22/article clipped. The scanning program can be customized for the project by proper choices of key words and may be altered as the responsibilities and functions of the office change through time. While the results of this clipping service would not constitute a comprehensive review of the program, it would provide an ideal system for keeping abreast of advances while minimizing staff workloads. Compilation of the articles would also provide an invaluable basis for analyzing changes in the physical environmental and socio-economic situation as the program develops.

Automatic data processing is another area which, if performed by an external support agency, would greatly enhance the effectiveness and efficiency of the AOSS staff. It appears that failures to utilize ADP will create a situation in which much of the staff experts' time will be devoted to review (not analyses) of volumes of raw data. Further, it appears unlikely that the limited number of staff members could accomplish the required analyses, along with their other considerable duties within time constraints. Current estimates call for two weeks of technical analysis for each quarterly report. Analysis of quarterly reports will therefore consume 50% of each technical expert's time, leaving him the other 50% for review of other reports, meetings, tract coordination, schooling, research and other required duties. ADP can reduce time requirements for analysis of data and if properly designed, automatically detect and flag dangerous trends before damaging the environment. Proper design of the system would also allow analysis of synergistic and antagonistic interactions of pollutants and facilitate timely up-dating and alteration of monitoring programs and requirements. A final benefit of ADP is that the data could be readily utilized by other government agencies, particularly if presently utilized systems are adopted by the AOSS ADP, i.e., SAROAD for air data and STORET for water quality data. The overall effect would be to greatly facilitate analyses of environmental quality and change on a regional basis.

5.6 Socio-Economic Aspects of the Prototype Oil Shale Leasing Program

A. Discussion

The development of an oil shale industry will have numerous socio-economic impacts upon the region. These effects can be identified, their impacts estimated, and plans to minimize the effects developed. Already studies have been performed for the Colorado West Council of Governments about regional socio-economic impacts and the attitudes and opinions of local residents about the oil shale industry. The MITRE project team recognized early in the project that the socio-economic aspects of the oil shale program required careful consideration. The second draft of the DDP outline contained a section on socio-economic impacts, however, it was removed at the request of the AOSS. The MITRE project team further discussed the socio-economic issue with the AOSS in a letter (14 March 1975, D50-283, Attachment 1, Article 6). The AOSS reiterated his position that the Lease terms do not require the Lessees to provide socio-economic impact information in the context of the DDP.

The changes in the land use brought about by the development of an oil shale industry and the influx of people will alter the life styles of the present residents. For example, land once used for recreation could be part of an oil shale recovery complex, housing development, or a trailer park for mobile homes. City and county services such as water, sewage, schools, police and fire protection could be strained, forcing an extension of these public services some of which require a long lead-time to become operational.

The development of an oil shale industry also has beneficial aspects. The tax base for the area should be increased and the money from wages should add to the area's economy.

The overall growth of the region can be viewed as both beneficial and detrimental depending on one's point of view. However, the development of an oil shale industry will have definite socio-economic impacts on the region.

B. Conclusion

Because the socio-economic aspects of the prototype oil shale leasing program are important, they should not be relegated to an obscure position. The AOSS has stated his desire to refrain from conducting socio-economic impact analysis.

C. Recommendations

Further consideration should be given to the conduct of socio-economic impact analysis by the Lessees. At a minimum, the AOSS should request of the Lessees sufficient information to project area-wide growth potential for the purpose of informing the Secretary and other

policy-level DOI personnel of potential regional problems in the context of the AOSS "Information" or "Policy Issue" reports.

Careful examinations should be made of other developing areas and their experiences should be used to the benefit of the oil shale program.

The socio-economic studies already performed should be reviewed and evaluated. If necessary new studies should be made.

Local governments should be assisted in planning (and with financial support if necessary) so that long lead-time projects for public services can handle the expected growth rate.

5.7 Future Oil Shale Leasing Activities

It is to be noted at the outset that the Secretary of the Interior committed his Department "to withhold further leasing of public oil shale lands (which comprise 80% of the known reserves) until the environmental effects of these prototype leases are better known."* Further, the Secretary declared that "a new Environmental Impact Statement will be completed before any further leasing takes place."**

But while we note that further commercial scale leasing will require a new generation of decision-making, both public and private, it also must be remembered that the prime objective of the prototype program was to provide the nation with an information base so that future decisions could be intelligently made. In sum, the prototype program was designed, and we believe will be appropriately administered, to determine whether full-scale oil shale development is technologically, economically and environmentally feasible for the future.***

With that in mind, this section of the final report addresses prospective problems and issues and recommends preparations for dealing with them during the conduct and administration of the existing prototype program.

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*Secretarial News Release, November 28, 1973, with attached "Decision Statement", P.A-6.

**Ibid.

***It is helpful to restate the goals of the prototype program as enunciated by then Secretary Morton in his Decision Statement of November 28, 1973, op.cit., p. A-4,5.

The goals are:

"1. To provide a new source of energy to the nation by stimulating the development of commercial oil shale technology by private industry;

2. To insure the environmental integrity of the affected area and at the same time to develop a full range of environmental safeguards and restoration techniques that will be incorporated into the planning of a mature oil shale industry, should one develop;

3. To permit an equitable return to all parties in the development of the public resource; and

4. To develop management expertise in the leasing and supervision of oil shale development in order to provide the basis for future administrative procedures."

5.7.1 Methods by Which AOSS Documents the Lesson Being Learned

A. Discussion

It is apparent that the AOSS and key members of his staff have numerous contacts with higher authorities in the Geological Survey. In addition, the AOSS is able to call upon regional representatives of the Solicitors office, other Department of the Interior agency personnel and key policy-level personnel on an as-needed basis. Support and policy guidance may or may not be timely and adequate from the point of view of the AOSS, depending on the nature of the request and the individuals involved.

It is also clear that, with respect to the AOSS and his immediate office, the prototype program is accomplishing goal number 4 as outlined below -- namely, "to develop management expertise in the leasing and supervision of oil shale development." What is not clear is whether other appropriate officials at other levels in the Department are, or will, benefit from the prototype program sufficiently to meet goal number 4.

The AOSS is committed by the lease to make information reports to the Chief, Conservation Division of the Geological Survey. However, the details of this reporting, including frequency, timing, content and format are yet to be determined by the issuance of a Conservation Division Procedure Manual.

Finally, no formal mechanism appears to exist which facilitates the systematic presentation of policy issues and questions to policy-level attention in the Department.

B. Conclusions

1) Day-to-day contact with departmental officials on administrative matters appears satisfactory from the point of view of the AOSS.

2) The AOSS is awaiting guidance from the as-yet-to-be-issued procedural manual on more formal and systematic reporting requirements.

3) While personal contacts between the AOSS and his superiors may be working well on an individual basis, there appears to be no formal mechanism for surfacing and resolving major policy matters affecting the prototype program.

C. Recommendations

1) That issuance of the Procedural Manual be expedited with specific attention paid to reporting and information requirements of the AOSS.

2) That the AOSS be provided with an opportunity to brief and resolve policy matters with his superiors, up to and including the Assistant Secretary, on at least a quarterly basis.

3) That the AOSS be prepared to provide material and guidance to such task forces or the like that may be created in the future for the purpose of evaluating the prototype program and reaching decisions with respect to further commercial scale leasing. The AOSS should prepare, at least on a yearly basis, a report to policy-level officials in the Department, describing major actions undertaken and an assessment of whether progress has been made toward meeting the stated goals of the prototype program.

5.7.2 Averting Policy Issues in Future Leases

A. Discussion

The major administrative problems and policy issues that have surfaced so far (that is, up to development of DDP Guidelines) in the conduct of the prototype program are as follows:

1) Level of detail required in the DDP.

2) Report requirements; Timing, Frequency, Content and Format.

3) Offsettable development expenses (bonus offset).

4) NEPA requirements.

5) Whether environmental impact analysis - including prediction, description of monitoring programs, description of control measures, and description of alternatives - should be a part of the DDP.

6) Lessees' Financial and Economic Reporting requirements.

7) The necessity for socio-economic impact information to be supplied by the Lessees, and whether Lessees have an obligation to assist state and local government in regional growth management. If so, what is the nature and extent of the obligation?

8) Federal preemption questions and their converse, namely, state, county or local assertions of authority, particularly with respect to:

a. Air Quality Regulations, including: ambient standards, Air Quality Maintenance Region requirements (proposed), Non-significant deterioration regulations (proposed).

b. Water Quality Regulations, including antidegradation requirements.

c. County environmental controls.

d. County Planning and Zoning authority.

e. Other county police powers.

9) Federal Reservation Doctrine (water contests).

10) Availability of water, particularly for Utah tracts.

11) Offsite Disposal proposals and adequacy of authority to grant.

12) Designation and approval of transportion corridors in order to allow for timely development.

13) Adequacy of revegetation technology.

B. Conclusions

1) An adequate identification of major policy issues has been made by the AOSS and his staff.

2) Many, if not all of these policy questions can be decided and disposed of during the course of the prototype program.

C. Recommendations

1) That the AOSS alert policy-level officials in the Department of the Interior to these policy problems (as noted in the previous section) and, with their assistance, seek to resolve them in a timely manner. While final resolution of some matters, such as the applicability of NEPA to the DDP approval process, may lie out of control of the AOSS - namely in the courts - and while other matters such as a determination of adequate revegetation technology may not be resolved until several years in the future, it is believed by MITRE that most of the above listed issues can be resolved with the Management Plan as proposed.

2) In order to facilitate this process, generally, the following conceptual outline is provided to facilitate the decision-making process:

MAJOR FEDERAL PROJECT DECISION-MAKING:
IMPACT ANALYSIS

I. WHAT IS DECISION-MAKING PROCESS

A) Pre-existing conditions displayed

B) Description of activities (operations and predicted environmental impact of those activities

C) Description of mitigating measures

D) Prediction of unavoidable impacts

Assessment of those unavoidable impacts against impacts of alternative courses of action.

E) Justification for cause of action chosen
Course chosen need not be least environmentally impacting IF other factors affecting decision are displayed:

National security
Economics/cost effectiveness
Timeliness
Conservation of mineral resources

II. ENVIRONMENTAL ELEMENTS OF DDP

A) Objectives
Display environmental information for two purposes:

1. Specific impact of the prototype.
2. Extrapolate to scaled-up program for the purpose of predicting the environmental impact of a full-scale program.

The purpose of the environmental elements of the DDP submission is to permit the AOSS to make an "environmental evaluation" of the proposed development and to undertake the following functions:

1st Predict the impacts of the proposed operations;

2nd Track the actual impacts of the actual operations;

3rd To highlight necessary corrective actions to be undertaken by the operators at the direction of the mining supervisor.

B) Conceptual Outline

(I) Existing environment
(II) Description of operations
(III) Description of alternatives to operations and selection criteria and rationale
(IV) Environmental controls/mitigation measures
(V) Impact of operations - on-site/off-site

(A) Environmental - by media
(B) Community
(C) Recreational
(D) Scenic
(E) Historical
(F) Etc.

C) Monitoring Outline

(I) Site specific vs regional impact monitoring
(II) Types of monitoring

(A) Emission
(B) Ambient
(C) Trend

(III) Purpose and objectives

(A) Determine pre-existing conditions
(B) Conduct monitoring program for purpose of:
Before)
During) - Development Operations:
After)

1. Recording changes - Trend
2. Check on compliance with
   a) Lease stipulations
   b) Applicable regulatory requirements
3. Timely noticing of detrimental effects
4. Providing basis for revising of environmental stipulations

(IV) Monitoring and reporting activity called for in lease:

(A) Predevelopment data reporting program - 2-year minimum
1. Quarterly reporting
2. Special 2-year report in context of DDP

(B) Continuous monitoring program and attendant reports - defined by parameters
1. Emission
2. Ambient
3. Trend
4. Red flag - deliterious effects

(V) Operational reasons for seeking information on commitments with respect to monitoring and associated reporting in the DDP "requirements" outline or guideline:

(A) The requirements of the lease, specific and by reference, require the Lessee to avoid, mitigate and restore adverse environmental impacts.

(B) Lessee is also required to spell out in DDP the steps he plans to take to do this.

(C) This requires a monitoring program which will permit him to measure the adverse impacts and the results of mitigation and to show the AOSS that he has satisfied the requirements of the lease.

1. Impacts:
   Adverse
   Mitigative
2. Project impacts - (the alternatives of making projections is to monitor to noise level)
3. Monitoring program tests projections

   a. Know what the impacts are
   b. Show what the impacts are

5.7.3 Key Factors Influencing Success of Future Leasing Activities

The single most critical factor influencing the future of shale oil development will be economic. If a decision, based upon the results of the prototype program, is made to commence with further federal

leasing, the product value and production costs will be determinative. It may well be that some artificial price guarantees may be required for a limited period of time to stimulate the next generation of shale oil production.

For the purposes of this report, however, we should limit our discussion to the impact of the prototype program on any prospective future commercial leasing. Simply stated, we must await the results of the prototype program before reaching a national decision with respect to future leasing.

The key elements of proof to emerge from the prototype program appear to be:

1. Will revegetation technology prove available and environmentally adequate.

2. Will water be available in quantities and qualities necessary for development.

3. Can such water be made available without unacceptable disruption of other activities - namely agriculture.

4. Can the secondary impacts of industrial development - growth - be managed by existing or improved institutions so that the quality of life in impacted areas is maintained to accepted standards.

5. Will state governments and their elected leaders permit further development or will regulatory requirements presently at their disposal be imposed which prohibit such development.

6. And in the last analysis, will the general public, both regionally and nationally, support potential future decisions to develop once the results of the prototype program have been carefully and honestly displayed.

No meaningful conclusions or recommendations can be made with respect to the future other than to admonish all who read this report that the prototype program is but the first step in a potential new resource development program of major proportions. And further, that the AOSS and his staff bear a heavy responsibility to see that their decisions are timely, based on the best evidence available, and open at all times to public scrutiny. The prototype program has been designed to get the facts about feasibility - environmental and technological - and then to display those facts to the public and decision-makers. We are confident that it will be administered to achieve those ends.

6.0 AREA OIL SHALE SUPERVISOR'S PROGRAM MANAGEMENT BRIEFING

MITRE has provided the AOSS with a proposed briefing on the "Management of the Prototype Oil Shale Leasing Program." It is assumed that the briefing will be targeted to interested groups outside of the AOSS Office, principally: Lessees, supervisory staff at other levels of the Department of the Interior, and interested citizen groups. Nevertheless, this same briefing can be easily updated to introduce new office staff to the management objectives and structure of the AOSS Office.

Briefing charts are provided. These can be reproduced by the AOSS as viewgraphs, handouts, etc. To enhance the oral presentation, textual material accompany the briefing charts. Optional charts displaying detailed background information are also provided.

MITRE has made no reference to its own role in the formulation of the present and proposed management system of the AOSS Office. Rather, the emphasis has been on identifying major program objectives, the setting forth of major tasks to be performed, a recitation of the accomplishments to date, and a description of the management process by which the AOSS proposes to direct the prototype program into the future. We believe that this briefing will provide viewers with both an understanding of the responsibilities of the AOSS with respect to the prototype program and a sense of confidence that the program is being intelligently and systematically managed for the achievement of its stated objectives.

APPENDIX I

MANAGEMENT PLAN VOLUME I

PREFACE

The Management Plan document, in two volumes, has been prepared by The MITRE Corporation under contract with the United States Geological Survey (USGS) to support the Area Oil Shale Supervisor (AOSS), USGS, in the discharge of his responsibilities in the management of the Oil Shale Leasing Program. Volume I - Management Plan (Appendix I) presents proposed procedures for use by the AOSS. Volume II - Guidance for Lessees (Appendix II) presents proposed outlines and procedures for the guidance of oil shale Lessees in preparing the plans and reports they are required to submit to the AOSS under the terms of the leases they have entered into with the Government.

While the material contained in the document is the sole responsibility of MITRE, and does not reflect the official position of any government agency, it has been prepared in close collaboration with the office of the AOSS, and has been strongly influenced by MITRE's extensive contacts during preparation with federal, state and local agencies and with officers and employees of the Lessees. Those persons who have contributed to its development are too numerous to cite in detail, but special acknowledgments are due to the Area Oil Shale Supervisor, Mr. Peter Rutledge, and members of his staff for their generous collaboration.

MANAGEMENT PLAN VOLUME I

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1.0 INTRODUCTION

1.1 Objective of the Prototype Oil Shale Program*

The prototype program was designed with these objectives in mind:

"1. To provide a new source of energy to the nation by stimulating the development of commercial oil shale technology by private industry;

2. To insure the environmental integrity of the affected areas and at the same time develop a full range of environmental safeguards and restoration techniques that will be incorporated into the planning of a mature oil shale industry, should one develop;

3. To permit an equitable return to all parties in the development of this public resource; and

4. To develop management expertise in the leasing and supervision of oil shale development in order to provide the basis for future administrative procedures."

1.2 Background of the Prototype Program

The prototype program will be conducted on four tracts, consisting of approximately 5,000 acres apiece, two in Colorado and two in Utah. Two additional program tracts exist in Wyoming but due to the low grade of the oil shale found there, no bids for these tracts have been received. Figure 1.1 shows the location of all six prototype program tracts.

Area Extent**

If all six tracts were developed, between 8,000 and 11,000 acres of land, both on-site and off-site, would be required for construction of mines, excavations, plant facilities, storage areas, and processed shale disposal areas. An additional 1,700 to 2,000 acres would be altered - in part or permanently - in the construction of roads, utility corridors of power, natural gas, water, and shale oil product lines. A maximum of 1,300 acres would be required for prototype development over a 30-year period, which is less than 0.2 percent of oil shale land surface area in the states of Colorado, Utah, and Wyoming.

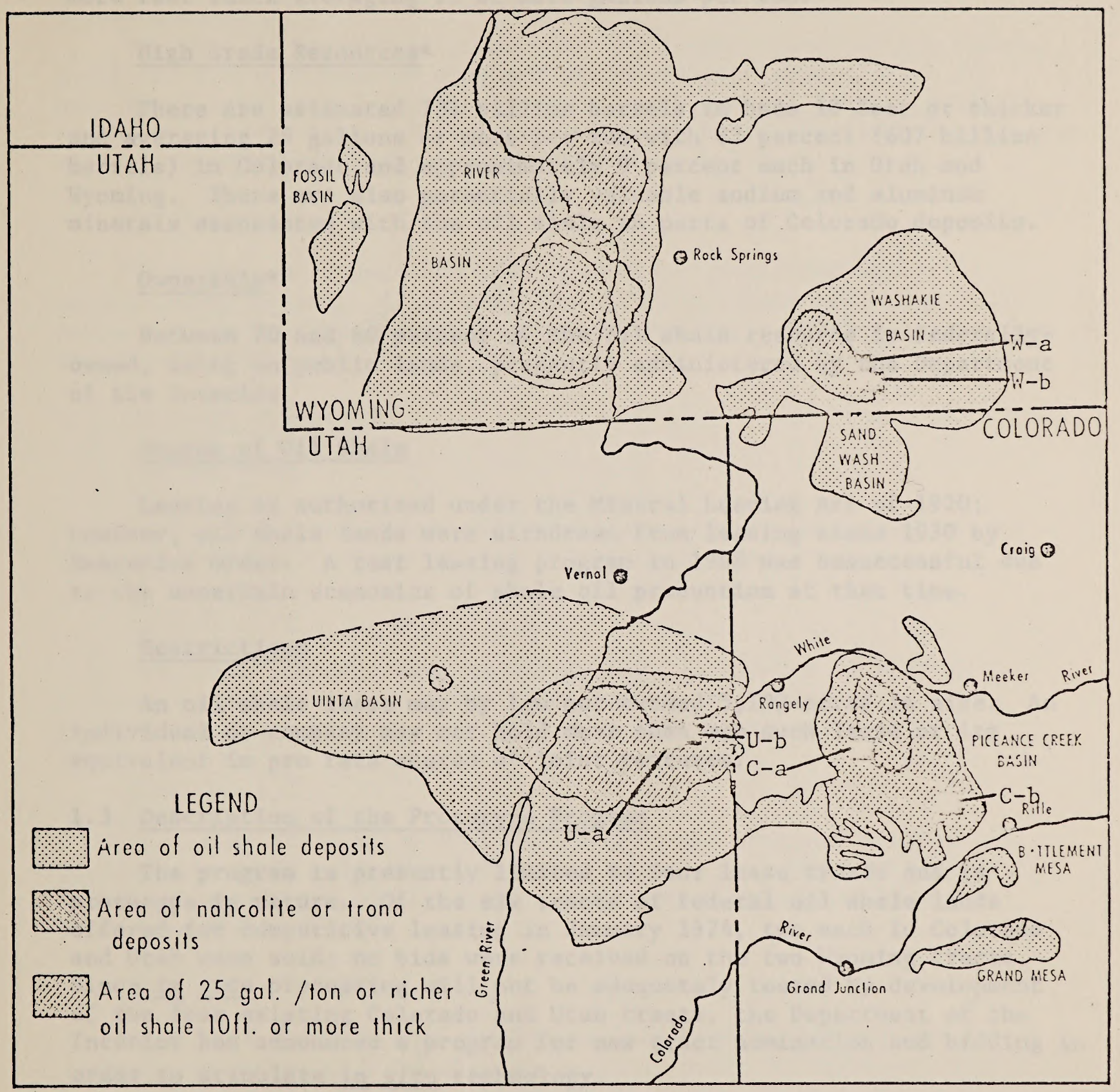
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* The following is taken from Secretarial News Release, November 28, 1973, pp.4-5 (see Appendix A of FEA Project Independence Blueprint Report, Potential Future Role of Oil Shale).

** Secretarial News Release, August 30, 1973, p.6.

FIGURE 1.1

OIL SHALE AREAS IN COLORADO, UTAH AND WYOMING





Total Oil Shale Resources*

The Green River Formation in Colorado, Utah and Wyoming probably contains more than two trillion barrels of shale oil in beds 10 or more feet thick averaging 15 or more gallons per ton.

High Grade Resources*

There are estimated 731 billion barrels in beds 10 feet or thicker and averaging 25 gallons or more per ton with 83 percent (607 billion barrels) in Colorado and approximately 9 percent each in Utah and Wyoming. There are also potentially valuable sodium and aluminum minerals associated with the oil shale in parts of Colorado deposits.

Ownership*

Between 70 and 80 percent of the oil shale resource is federally-owned, being on public lands, presently administered by the Department of the Interior

Status of Oil Shale

Leasing is authorized under the Mineral Leasing Act of 1920; however, oil shale lands were withdrawn from leasing since 1930 by Executive Order. A test leasing program in 1968 was unsuccessful due to the uncertain economics of shale oil production at that time.

Restrictions

An oil shale lease may by law not exceed 5,120 acres in size. An individual or company may not hold more than one such lease or its equivalent in pro rata shares of joint ventures.

1.3 Description of the Prototype Program

The program is presently limited to four lease tracts and is prototype in nature. Of the six tracts of federal oil shale lands offered for competitive leasing in January 1974, two each in Colorado and Utah were sold; no bids were received on the two Wyoming tracts. Since in situ processing will not be adequately tested by development of the four existing Colorado and Utah tracts, the Department of the Interior has announced a program for new tract nomination and bidding in order to stimulate in situ technology.

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*Drawn from Oil Shale Program Summary, Department of the Interior, Office of the Secretary, Denver, Colorado, November 1974.

Provisions

Competitive lease offerings provide for cash bonus payments, land rental payments, and minimum royalty payments which begin in the sixth year and accelerate thereafter to encourage development and actual production.

Exacting environmental protection requirements provide for federal, state and public review of proposed oil shale development plans for each lease tract and for adding further environmental requirements if needed at a later date. Full compliance with state and federal pollution and environmental quality laws is required.

Further Leasing

No additional commercial leasing will be considered until the environmental effects of the prototype program itself have been fully evaluated and an environmental impact statement for further leasing has been prepared.*

1.4 Sequence of Events

January 1970

An oil shale task force was established by the Department of the Interior to develop the prototype oil shale leasing program.

June 4, 1971

President Nixon's first energy message called for "a leasing program to develop our vast oil shale resources provided that environmental questions can be satisfactorily resolved."

June 29, 1971

Secretary of Interior Morton announced the proposed program. A preliminary draft environmental impact statement, a program statement, and studies prepared by oil shale committees of Colorado, Utah and Wyoming were released.

July 1971

Core hold drilling was authorized under strict environmental controls to gather oil shale resource data, water and environmental information on potential oil shale tracts in the three-state region (thirty-four exploratory core holes, with a total footage of 51,686 feet, were drilled in Colorado and Utah as a result).

---

*Secretarial News Release of August 30, 1973, p.2; and Secretarial News Release of November 28, 1973, p.6.

November 2, 1971

Interior Department invited nominations of proposed oil shale leasing tracts.

January 31, 1972

At close of lease nomination period industry had submitted 23 nominations on 18 separate tracts - 13 in Colorado, 4 in Utah and 1 in Wyoming. This was supplemented by 2 tracts nominated by the Governor of Wyoming, bringing the total to 20 tracts.

April 25, 1972

After review by a field committee, the Interior Department, and state representatives, six tracts were recommended to the Secretary of Interior for leasing. The selections were publicly announced with the concurrence of the three governors involved.

September 7, 1972

Release of Draft Environmental Impact Statement in three volumes covering Oil Shale Technology and Regional Impacts, Energy Alternatives, and Impacts of Development of the Selected Tracts.

October 10-13, 1972

Public hearings at Denver and Grand Junction, Colorado; Rock Springs and Cheyenne, Wyoming; Salt Lake City and Vernal, Utah. Ninety-five individuals testified at the six hearings with supporting documents totaling 388 pages submitted. Transcripts of the hearings total 450 pages.

November 7, 1972

Completion of the 60-day public review period which resulted in submission of 202 separate statements and letters which, with backup material, totalled 1,939 pages.

April 18, 1973

President Nixon's second energy message reiterated the intention to proceed with leasing if environmental risks were found acceptable.

June 21, 1973

Department of Interior extended period for authorizing informational core drilling for an additional two years, until June 30, 1975.*

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*See page 3 of Department of Interior, Office of the Secretary, Denver, Colorado, "Oil Shale Program Summary", dated November 1974.

July 13, 1973

Proposed oil shale lease and stipulations circulated for review.

August 30, 1973

Final Environmental Impact Statement (in six volumes) submitted to the Council on Environmental Quality and released to the public.

November 28, 1973

Secretary of Interior Morton announced that the prototype leasing program would be implemented with the first lease sale to be held on January 8, 1974 (see Table 1.1).

November 30, 1973; December 7, 1973; December 10, 1973

The Federal Register published notices and schedules of lease sales, final lease terms and stipulations and bidding procedures.

February - March, 1974

The Oil Shale Task Force was dissolved in February 1974 and the Secretary of Interior in March 1974 established the Oil Shale Environmental Advisory Panel to advise the Geological Survey Mining Supervisor and the Bureau of Land Management District Managers on environmental matters in connection with the review of the environmental provisions of development plans, to assist in public hearings on environmental aspects of the prototype program, and to prepare annual reports on environmental aspects of oil shale development.

1.5 Prototype Program Phases

The term of each Oil Shale Lease is for 20 years, and may be extended for as long as commercial production is maintained. The Lessees must submit exploration plans and Detailed Development Plans (DDP), to the Area Oil Shale Supervisor for review and approval, and collect environmental baseline data before tract development and mining operations can begin. Upon approval of a development plan, the Lessees are granted the "exclusive right and privilege to prospect for, mine, process by retorting or by in situ methods or otherwise, utilize and dispose of all Lease Deposits..."* At the end of the 20-year term, new lease terms may be proposed by the Lessor, at which time the Lessees have the Option to either renegotiate or terminate the lease. There are critical periods during the lease term which when considered together result in eight distinct phases of the prototype program.

*See the Prototype Oil Shale Program Lease, Appendix I-4

TABLE 1.1

LEASE SALES*

Date	Tract	High Bid	Bidder	Estimated Recoverable Resource
January 8, 1974	C-a	$210,305,600	Standard Oil of Indiana	1.3 bill. bbls. of oil in 30 gal. shale
February 12, 1974	C-b	$117,778,000	Atlantic Richfield Ashland Oil Shell Oil The Oil Shale Corp.	723 mil. bbls. of oil in 30 gal. shale
March 12, 1974	U-a	$75,596,800	Sun Oil Co.** Phillips Petroleum**	331 mil. bbls. of oil in 30 gal. shale
April 9, 1974	U-b	$45,107,200	White River Shale Oil Corp.	271 mil. bbls. of oil om 30 gal. shale
May 13, 1974	W-a	No bids received		35 mil. bbls. of oil in 20 gal. shale (in situ process)
June 11, 1974	W-b	No bids received		352 mil. bbls. of oil in 20 gal. shale (in situ. process)

* Information on this table is found in the Oil Shale Program Summary. U.S. Department of Interior, Office of the Secretary, Denver, Colorado: November, 1974, pg. 3.

** Member of White River Shale Project

Table 1.2 lists these eight phases and the approximate lease years during which they occur. The prototype program is currently in the Pre-Development Phase, i.e., the lease has been issued and almost all sections of the Exploration Plans have been approved. Baseline data reporting and development of a DDP have begun.

1.6 Objective of the Management Plan

As on-tract manager of the prototype program, the AOSS has primary responsibility to coordinate efforts among his staff, between his staff and the Lessees, and between other organizations (public and private) interested in keeping track of progress on the program. The AOSS's prime concern at this time in the program activities is to review and approve or disapprove Baseline Data Reports (Phase III) and the Detailed Development Plans (Phase IV) so that the objectives of the Prototype Leasing Program can be met. The objective of this Management Plan is to assist him in securing these approvals. The plan that is presented below sets forth goals, objectives, procedures and management structure and interfaces necessary to expedite baseline data presentation and development of Detailed Development Plans through the final approval process by the Area Oil Shale Supervisor.*

1.7 Outline of the Management Plan

The Management Plan presented in the report and the accompanying appendices provide the AOSS with the following information:

- Major references used to prepare this report;
- Identification of the key program participants and their roles in the prototype program;
- Management procedures to be implemented by the AOSS;
- Schedules and communications paths required to support program activities; and
- An outline of the actions to be performed by the Lessees.

The objective of the Management Plan is to describe the procedures and guidelines for the management of the prototype program that the AOSS should adopt during its Pre-Development Phases. Although some parts of this Management Plan could be applied to all phases, it is expected that important revisions would have to be incorporated into the Plan to meet the objectives of the Development and Operational

---

*United States Geological Survey, Statement of Work, Contract Number 14-08-0001-15124, Exhibit A, page 3.

TABLE 1.2

PROTOTYPE OIL SHALE PROGRAM PHASES

PRE-DEVELOPMENT PHASES - LEASE YEARS 1-3

I Issuance of the Lease
II Submission and Approval of Exploration Plans
III Baseline Data Collection Effort
IV Submission and Approval of DDP

DEVELOPMENT PHASE - LEASE YEARS 4-6

V Development of On-Tract and Off-Tract Areas

OPERATIONAL PHASE - LEASE YEARS 6-20

VI Mining and Processing of Lease Tract Deposits

POST-OPERATIONAL PHASES - LEASE YEAR 20

VII Termination of Operations
VIII Decommissioning of the Project and Relinquishment of the Reclamation Bond.

Phases. A recommendation of this report is that upon completion of Phases III and IV, a separate consideration of the management aspects of Phases V-VIII be made. It should also be noted that in writing the Management Plan an effort was made to distinguish between what has been recommended and what has already been implemented by the AOSS.

2.0 LIST OF REFERENCES

This section contains a listing of the major references used in the preparation of this report.

- United States Department of Interior, Bureau of Land Management, Oil Shale Lease and Oil Shale Lease Environmental Stipulations for Tracts C-a, C-b, U-a and U-b (Appendix I-4)

- Final Environmental Statement for the Prototype Oil Shale Leasing Program, six volumes, prepared by the United States Department of Interior, 1973

- Charter of the Oil Shale Environmental Advisory Panel, Rogers, C.B. Morton, Secretary of the Interior, 27 February 1974

- United States Department of Interior, Departmental Manual, 615.3, Prototype Oil Shale Leasing Program, 27 February 1974

- United States Department of Interior, Office of the Secretary, Order Number 2948, Division of Responsibility Between the Bureau of Land Management and the Geological Survey for Administration of the Mineral Leasing Laws - Onshore, 6 October 1972 (Appendix I-7)

- Title 30 CFR Part 231, Mineral Resources, Chapter II - Geological Survey, Department of the Interior, Operating Regulations for Exploration, Development and Production (Appendix I-8)

- Title 43 CFR Part 23, Public Lands: Interior, Subtitle A, Office of the Secretary of the Interior, Surface Exploration, Mining and Reclamation of Lands (Appendix I-8)

- Federal Tract C-a Exploratory Plan, May 1974, submitted by Gulf Oil Corporation and Standard Oil Company

- Exploration Plan for Colorado Tract C-b, May 15, 1974, submitted by Ashland Oil, Atlantic Richfield Company, The Oil Shale Corporation

- Partial Exploration Plan, Environmental Baseline Data Collection and Monitoring Program (Tracts U-a and U-b), July 1, 1974, submitted by Sun Oil Company, Phillips Petroleum Company and White River Shale Oil Company

- Area Oil Shale Supervisor's Office, Letters of Approval for Portions of Exploratory Plans as of 31 March 1975

- Federal Register, Vol. 38, No. 230, Friday, 30 November 1973, Prototype Oil Shale Leasing Program - Notice of Sale
- Federal Register, Vol. 38, No. 235, Friday, 7 December 1973, Oil Shale Leases - Notice of Sale; Corrections
- Federal Register, Vol. 38, No. 236, Monday, 10 December 1973, Competitive Lease Offer of Oil Shale Lands
- ibid, Oil Shale Leases - Notice of Sale; Corrections
- FEA Project Independence Blueprint Report, Potential Future Role of Oil Shale, 1974
- Department of the Interior, Secretarial News Release, 28 November 1973
- Department of the Interior, Secretarial News Release, 30 August 1973
- Department of the Interior, Office of the Secretary, Oil Shale Program Summary, Denver, Colorado, November 1974

3.0 KEY PROGRAM PARTICIPANTS

3.1 Introduction

Two principle tasks for a manager of any operation are to identify lines of authority and delegate responsibility. Properly executed, these tasks focus or maximize staff participation in current operations and allow the managers to concentrate on long-range issues.

The purpose of this section is to identify the key participants in the prototype program and to discuss their roles in the program. While this section provides the reader with many of the major responsibilities and authority of each participant, the scope of the prototype program can only really be appreciated by a careful reading of the documents listed in Section 2.0 above, especially the oil shale leases and titles 30 and 43 of the Code of Federal Regulations. A much more thorough treatment of the areas of authority and responsibility can be found in these documents. Special attention is given in this section to the division of responsibility between the Bureau of Land Management (BLM) and the Geological Survey (GS). Secretarial Order 2948 provides guidance in this regard.

3.2 Lessees

Table 1.1 (above) identifies the Lessees of the prototype program. It should be noted that the original Lessees of tracts U-a and U-b have merged into a new joint venture called the "White River Shale Project".

3.2.1 Pre-Development Phase Tasks

Plans and Reports

The primary objective of the Lessees during the Pre-Development Phase is to secure the exclusive right to develop their oil shale lease deposits. They gain the right to begin development and mining operations only after:

1. Exploration Plans have been submitted and approved.
2. Baseline data have been collected and an approved monitoring program has been established.
3. Detailed Development Plans have been submitted and approved.*

There are incentives for the Lessees to submit plans and reports that will obtain quick approval by the appropriate review groups. For example, if development operations begin by the fourth lease year, expenditures directly related to the development of lease deposits may be credited against the fourth and fifth lease bonus payments, or if

*See Section 5.2 of this report for a description of these three documents.

incurred in later years, against the minimum royalties due on the sixth, and up to and including the tenth, lease Anniversary Date.*

Financial Obligations

In addition to these requirements for plans and reports, the Lessees have a number of financial obligations that must be performed during the Pre-Development Phase. These obligations include:

1. Maintain a $20,000 bond to insure compliance with the lease provisions;

2. Maintain a separate bond (the amount to be determined by the AOSS but not be less than $20,000) conditioned on compliance with the regulations in 30 CFR Part 231 and 43 CFR Part 23, the provisions of sections 10 and 11 of the Oil Shale Lease, and any approved exploration plan;**

3. Pay annual rent ($.50 per acre) on leased land;

4. Make five lease bonus payments on the first day of the first five lease years; and

5. Beginning in the sixth lease year pay minimum royalties on all resources extracted.***

3.3 Lessor

The Lessor of the Oil Shale Lease is the United States Government represented by the Secretary of the Interior. Secretarial Order 2948 sets forth the division of responsibility between the BLM and the GS for the administration of on-shore mineral leasing laws including the prototype oil shale program.

Until the issuance of the Oil Shale Lease, the BLM had sole responsibility for the management of lease tract operations. At the time of the issuance of the lease, that responsibility passed to the GS, who now represents the Secretary in all matters relating to the supervision of operations. The BLM retains responsibility for the management of off-tract lands.

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* See section 7(e) (2) of the Oil Shale Lease, Appendix I-4
** See section 9(a) and (c) of the Oil Shale Lease, Appendix I-4
***Unless extraordinary events prevent the Lessee from developing lease deposits. See section 7(e) (1) of the Oil Shale Lease, Appendix I-4

Other general responsibilities of the BLM include:

1. Consult with the Geological Survey on the adequacy of the surface use, environmental protection, and reclamation aspects of the exploration and development plans.

2. Approval of access roads, pipelines, utility routes, and other surface uses outside the operating area.

3. Conduct compliance examinations of environmental protection requirements on off-tract areas.

4. Report to the GS all environmental infractions, and proposed changes in lease terms, regulations, instructions, and other changes that would affect each agency's management responsibilities.

3.4 Area Oil Shale Supervisor

The AOSS, referred to in the lease as the "mining supervisor," is the representative of the Geological Survey and since issuance of the lease also represents the Secretary of the Interior. The AOSS has primary responsibility for the management of the prototype program, in particular, assuring compliance with the Oil Shale Lease Environmental Stipulations.

The Area Oil Shale Supervisor has primary responsibility for on-tract operations, specifically to make all geologic, engineering, and economic value determinations for the oil shale program.

The AOSS has been delegated responsibility to:

1. Conduct inspections on on-tract areas to insure compliance with lease terms and report instances of noncompliance to BLM;

2. Consult with the BLM on the adequacy of surface use, environmental protection, and reclamation aspects of the exploration and development plans;

3. Submit orders to Lessees for any remedial action;

4. Maintain engineering, geologic, geophysical, economic, and other technical expertise needed to assure compliance with applicable laws, operating regulations, and the program objectives; and

5. Be the Office of Control of all proprietary data required to be submitted under Title 30 CFR Parts 200, 211, 218, 221, 231, 270, and related regulations.

During the Pre-Development Phases of the prototype program, the AOSS is responsible for guiding the Baseline Data Reports and the Exploration and Detailed Development Plans through the review and evaluation and final approval processes. A detailed discussion of what this entails can be found in section 5.2 of this report.

3.5 Oil Shale Environmental Advisory Panel

The Oil Shale Environmental Advisory Panel (OSEAP) has been established under the authority of the Federal Advisory Board Act (PL 92-463) and OMB Circular A-63. The Panel consists of a chairman appointed by the Secretary of the Interior, representatives of specific bureaus and officers of the Department of Interior, representatives of other Federal departments, state and county members, and members at large.

The Panel's main function is to advise the District Manager of the BLM and the AOSS on environmental aspects of the prototype program and to submit an annual report to the Secretary of the Interior summarizing the environmental status of the prototype program. Although the Panel's recommendations are suggestive and not directive, any panel member may voice objections to a decision made or an action taken by the AOSS or the District Managers and they may present their objections to the Panel and other officials of the Department, up to and including the Secretary, in accordance with specifically designated channels of appeal.

The following are the Panel's major responsibilities:

- Advise officials of the Department on the environmental objectives of the prototype program.
- Prepare an annual report to the Secretary on the environmental aspects of the prototype program.
- Assist the AOSS and the District Manager in conducting public hearings.
- Meet at least quarterly in open session.

3.6 Secretary of the Interior

The Oil Shale Lease reserves certain authority and responsibility to the Secretary, but Secretarial Order 2948 permits both the Bureau of Land Management and the Geological Survey (i.e., the AOSS) to represent the Secretary in the management of land mineral resources. The BLM is the "office of action". It can initiate court proceedings, suspend or terminate operations, or cancel the lease. The GS, on the other hand, represents the Secretary "...in all matters relating to the supervision of operations."*

3.6.1 Delegation of Authority and Responsibility

The Oil Shale Lease vests authority in the Secretary in specific areas, The Secretary:

1. Can accept a surrender or relinquishment of the Lease.

2. May excuse the Lessee from compliance, in whole or in part, with the minimum royalty payments if lessee is prevented by circumstances beyond his control from implementing a development plan.

3. May approve nuclear fracturing for in-situ developed oil shale after Lessee has submitted an environmental impact statement.

4. Has access to books, records, and accounts of the Lessee for purposes of investigation to ascertain compliance with the Equal Employment Opportunity rules, regulations and orders of Section 19.

5. May cancel, terminate, or suspend the Lease for non-compliance with the Equal Employment Opportunity rules, regulations and orders of Section 19.

The main responsibilities of the Secretary under the Oil Shale Lease are:

1. To compute annually the combined average value per barrel of all crude oil and crude shale oil produced in Colorado, Wyoming and Utah.

2. To determine if extraordinary costs incurred by the Lessee to maintain or fulfill DDP requirements may be credited against royalties.

3. To determine if funds spent by the Lessee in excess of $500,000 on revegetation are extraordinary and hence may be credited against present or future royalties.

*Secretarial Order 2948, Section 2(c) (2), Appendix I-7.

3.7 Other Interested Parties

In addition to the offices in the Department of the Interior identified above, there are many federal, state and local government agencies, and the public in general, that are interested in the prototype program. Federal agencies like the Environmental Protection Agency, the Department of Agriculture, the Department of Commerce, HUD, HEW, and the Department of Transportation are represented on the OSEAP. On the state level, Colorado representatives on the OSEAP are the Colorado State Geologist and the Division of Wildlife; Utah is represented by the Department of Natural Resources and the Division of State Lands. Representation on the Panel assures these other federal agencies and the states involved that they will have ready access to prototype program information as well as be able to help advise on the direction the program is taking.

Wisely, the charter of the OSEAP provides for citizen representation: the Governors of Colorado and Utah each may appoint a citizen to the Panel who is active in environmental matters (both Governors appointed members of the Audubon Society); the Secretary retained the right to appoint three more public members from among persons active in environmental matters (he appointed the Dean of the College of Natural Resources at Utah State and a member of the Colorado House of Representatives).

While the Panel only acts in an advisory capacity to the AOSS and the BLM District Manager, the very broad representation of its membership helps to insure that all aspects of environmental issues - as viewed by federal and state agencies and private environmental groups - will surface and be discussed in open forum before action is taken in the program. The Panel attempts to give local visibility to its deliberations by rotating its meetings to different locations in Utah and Colorado. This has occurred eight times in the past year; two of these meetings were held in the counties where the lease tracts are located.

4.0 MANAGEMENT PROCEDURES

4.1 Introduction

4.1.1 Management Procedures Outlined

This section develops management procedures to assist the Area Oil Shale Supervisor in achieving the objectives of the Pre-Development Phases of the prototype oil shale program. Although the management procedures are presented in four separate parts, if the parts are considered together, they form a useful process for the administration of the AOSS Office.

Part one identifies the tasks the AOSS and his staff must complete to achieve the Pre-Development Phase objectives. A Master Milestone Schedule (Figure 4.1) shows the interrelationships of these tasks.

Using this list of tasks, part two develops a number of program planning and budgeting tables which, as a whole, constitute an "Outline Accomplishment Plan". Part three presents a Management-By-Objectives (MBO) process and describes how this process can be used to organize the AOSS Office and to insure that the program tasks are properly completed. It will be shown that a successful MBO process depends heavily on a well-formulated Accomplishment Plan. Lastly, part four presents several management aids in the form of work charts, program schedules, staff meetings and agendas, and a data management system.

The AOSS Office, for the most part, is not unfamiliar with these management procedures (they are utilized to some degree by the Office) but has not at this time integrated the procedures into a well-defined process. The discussion below points to critical scheduling problems expected to occur in the upcoming years and to the future needs of this leasing program and others like it, and offers these as justification for a more structured management process.

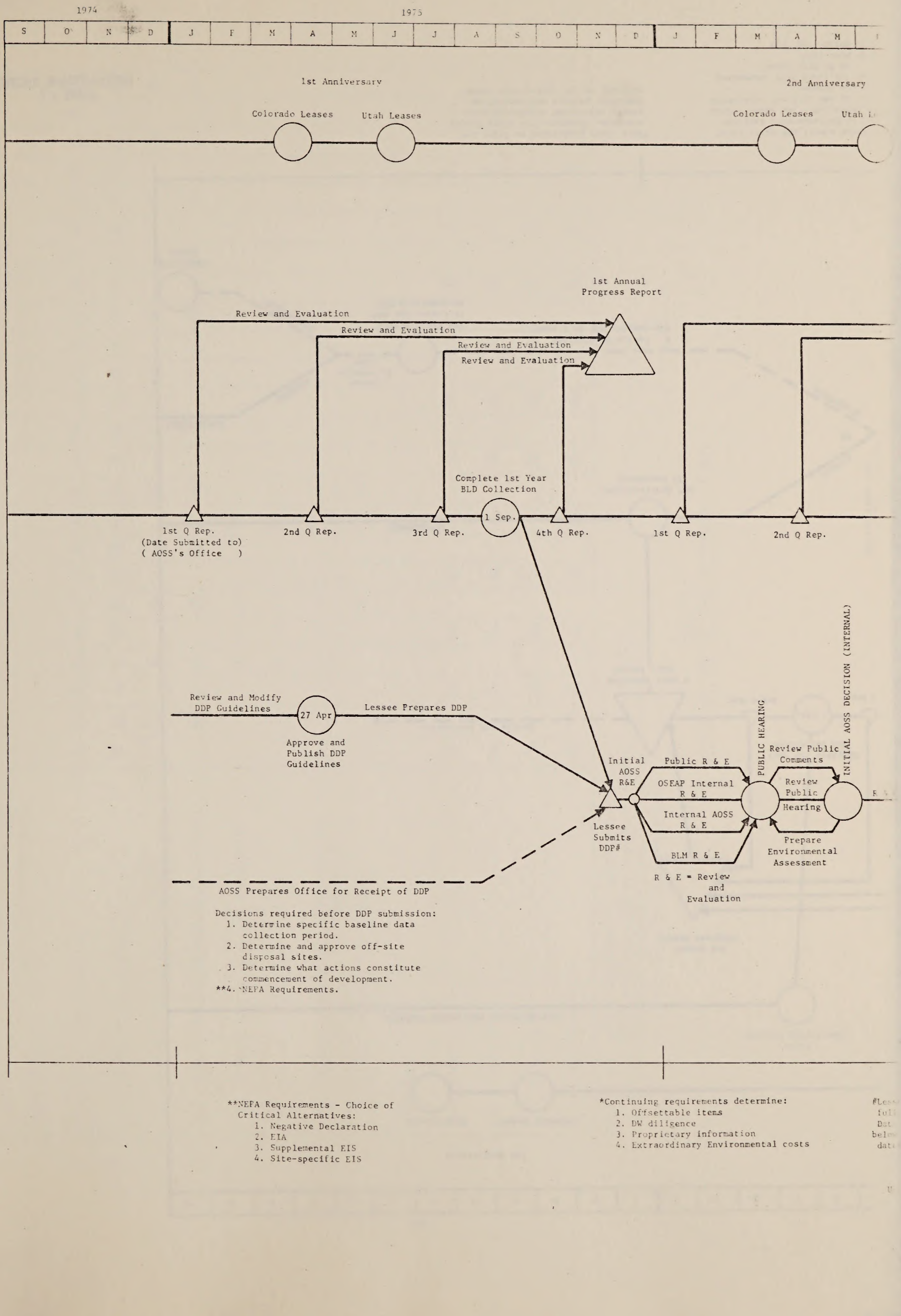
4.2 Part One: Tasks Identified

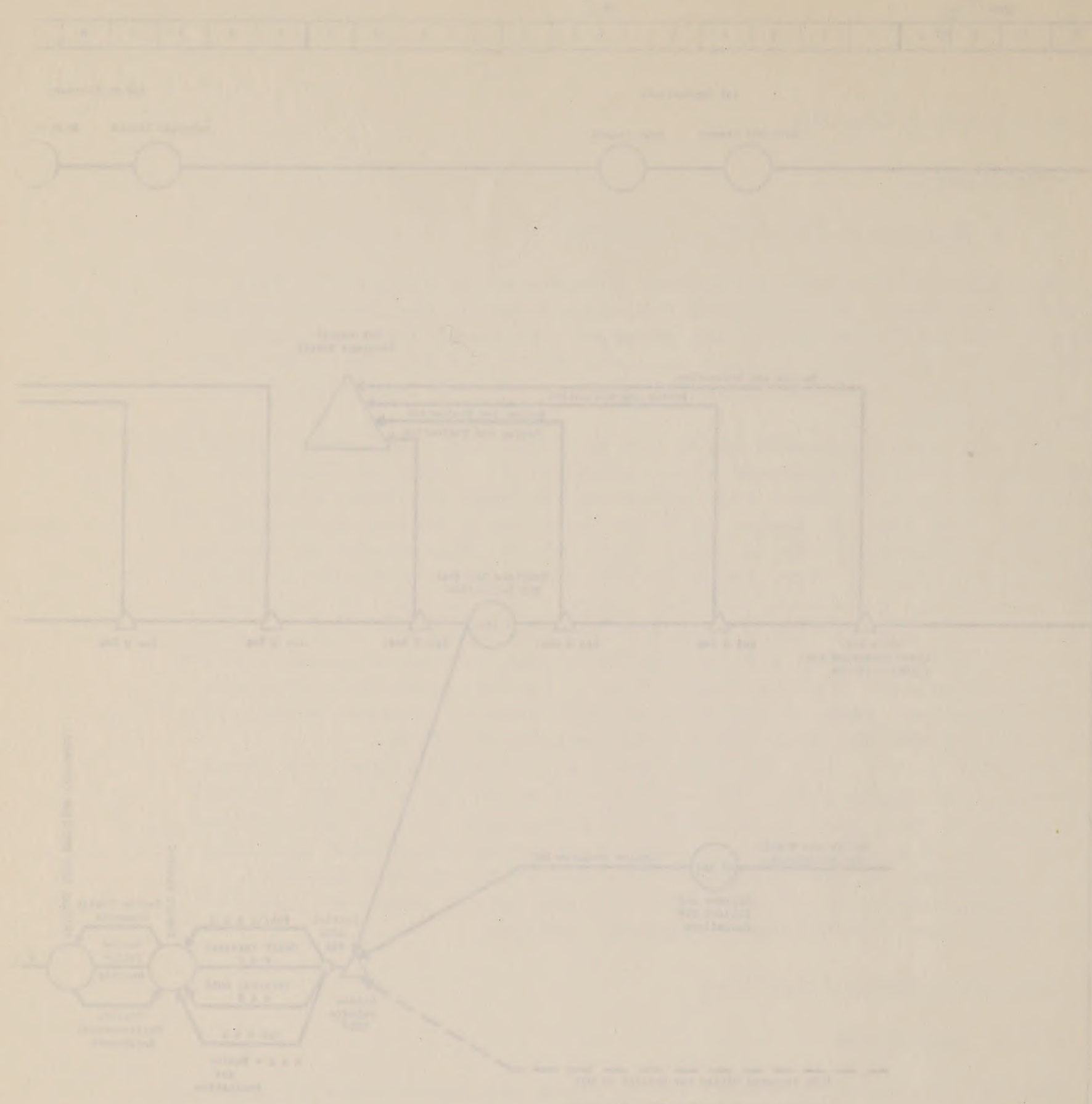
4.2.1 Task Areas

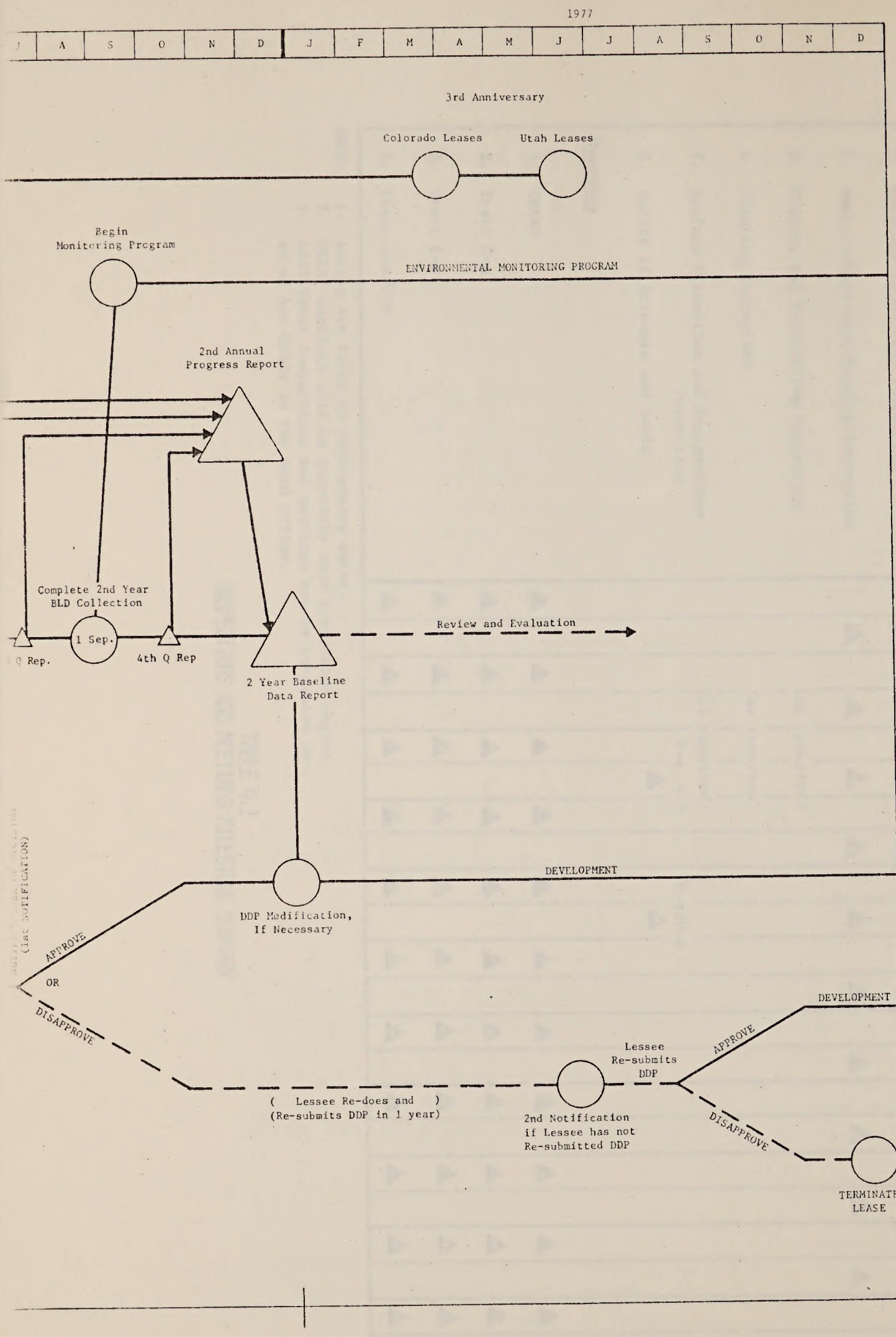
Most of the Pre-Development Phase tasks are concerned with expediting the review and evaluation of the Environmental Baseline Data collection effort and the final approval of the Detailed Development Plans. In addition to these tasks, the AOSS and his staff must conduct several types of inspections and hold meetings amongst themselves and with other parties. Table 4.1 identifies these inspections and meetings and the times at which they are to be held. A description of the meetings with other parties and inspections can be found in sections 5.3 and 5.4 of the Management Plan, Volume I.

4.2.2 Master Milestone Schedule

Since some of the AOSS's primary concerns are with the environmental


1974
1975
S O N D J F M A M J J A S O N D J F M A M
1st Anniversary
2nd Anniversary
Colorado Leases
Utah Leases
Colorado Leases
1st Annual
Progress Report
Review and Evaluation
Review and Evaluation
Review and Evaluation
Review and Evaluation
Complete 1st Year
BLD Collection
1 Sep.
1st Q Rep.
(Date Submitted to)
(AOSS's Office)
2nd Q Rep.
3rd Q Rep.
4th Q Rep.
1st Q Rep.
2nd Q Rep.
Review and Modify
DDP Guidelines
27 Apr
Approve and
Publish DDP
Guidelines
Lessee Prepares DDP
Initial
AOSS
R&E
Public R & E
OSEAP Internal
R & E
Internal AOSS
R & E
BLM R & E
PUBLIC HEARING
Review Public
Comments
Review
Public
Hearing
Prepare
Environmental
Assessment
INITIAL AOSS DECISION (INTERNAL)
Lessee
Submits
DDP#
R & E = Review
and
Evaluation
AOSS Prepares Office for Receipt of DDP
Decisions required before DDP submission:
1. Determine specific baseline data collection period.
2. Determine and approve off-site disposal sites.
3. Determine what actions constitute commencement of development.
**4. NEPA Requirements.
**NEPA Requirements - Choice of Critical Alternatives:
1. Negative Declaration
2. EIA
3. Supplemental EIS
4. Site-specific EIS
*Continuing requirements determine:
1. Offsettable items
2. DW diligence
3. Proprietary information
4. Extraordinary Environmental costs

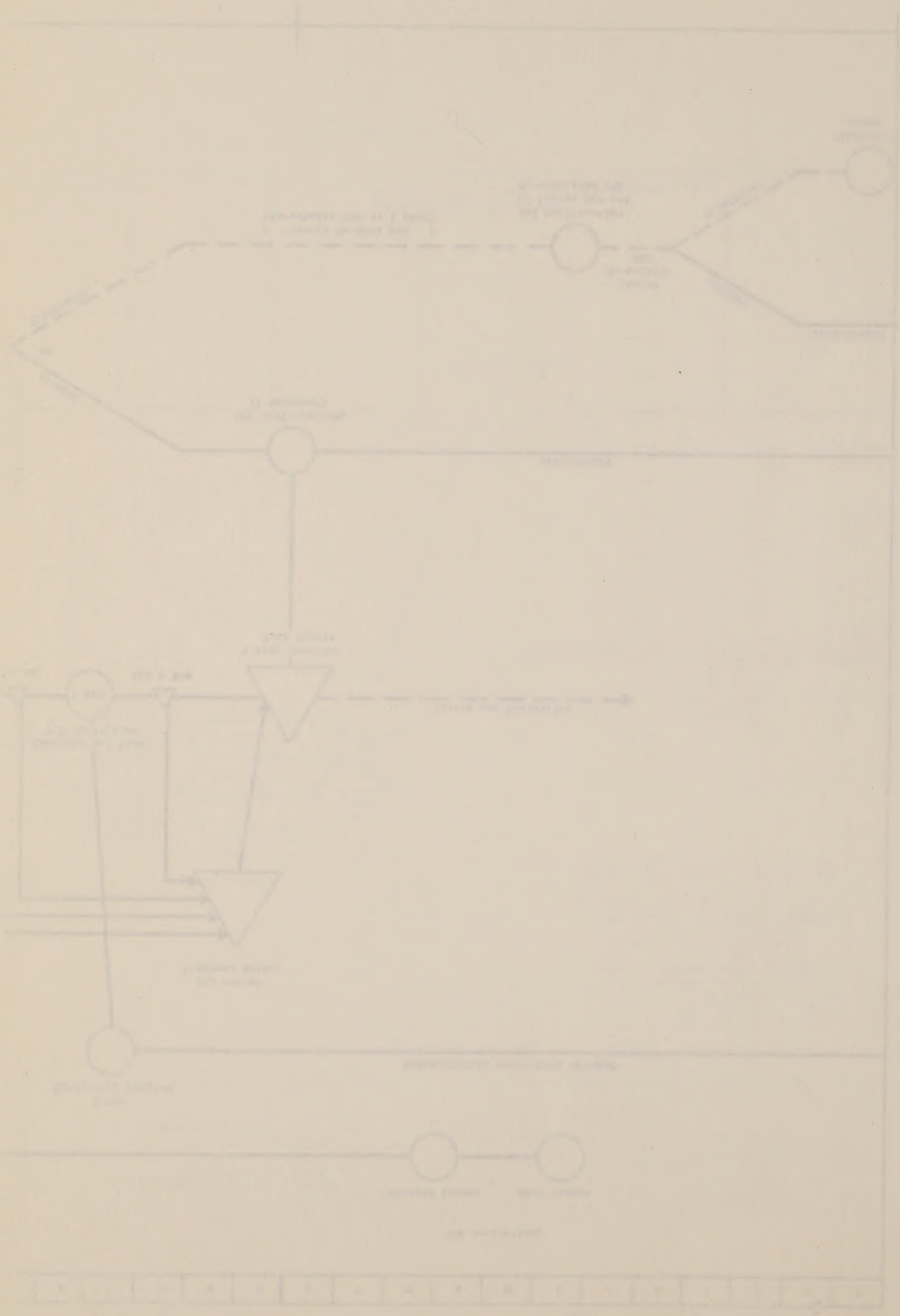




cannot submit DDP until first
ar of Environmental Baseline
e collected. The dates listed
ld be the earliest submission
for the Lessees.
-a: Jan.-June 1976 (depending
on 84 MESA issue)
-b: Nov. 1975
-b: March-June 1976

#This chart predicated on Tract C-b schedule. However, for other Tracts simply adjust DDP submission point (approval process and monitoring program) to the appropriate dates.

FIGURE 4.1
MASTER MILESTONE SCHEDULE



	JAN.		FEB.		MAR.		APR.		MAY		JUN.		JUL.		AUG.		SEP.		OCT.		NOV.		DEC.	
Inspections																								
1. Operations Inspection	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
2. Air/Water Management Inspection	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
3. Minerals Production Inspection		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
4. Rentals/Royalties/Bonding Inspection		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
5. Grading and Backfilling Inspection			(as required)																					
6. Planting Inspection			(as required)																					
7. Surface Protection and Reclamations Inspection			(as required)		C-a, C-b				U-a/U-b															
8. Audits of Accounts and Books					▲				▲															
Meetings																								
1. OSEAP	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
2. Tract C-a	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
3. Tract C-b	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
4. Tract U-a/U-b	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	

NOTE:
1. Audits are keyed to anniversary dates.
2. OSEAP meetings will be quarterly once production begins.
3. Additional inspections and meetings may be scheduled on an ad hoc basis as the need arises.

TABLE 4.1
INSPECTIONS AND MEETINGS MILESTONE SUMMARY

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Inspection												
1. Operations Inspection	△	△	△	△	△	△	△	△	△	△	△	△
2. Airplane Equipment Inspection	△	△	△	△	△	△	△	△	△	△	△	△
3. Materials Production Inspection		△		△		△		△		△		△
4. Materials Utilization Inspection		△		△		△		△		△		△
5. Grading and Facility Inspection												
6. Planning Inspection												
7. Airline Inspection and Maintenance Inspection												
8. Audits of Accounts and Books												
Training												
1. CAA	△	△	△	△	△	△	△	△	△	△	△	△
2. Civil Air	△	△	△	△	△	△	△	△	△	△	△	△
3. Navy Civ	△	△	△	△	△	△	△	△	△	△	△	△
4. Navy Contract	△	△	△	△	△	△	△	△	△	△	△	△

NOTES: 1. Audits are based on accountant data.
2. Other meetings will be scheduled during production periods.
3. Additional inspections and meetings may be scheduled or as at for basis on the need arises.

baseline data in the Quarterly Progress Report and with the Detailed Development Plans (DDP), a Master Milestone Schedule (Figure 4.1) was developed that identifies the tasks associated with these plans and reports. The schedule shows the preparation, review and evaluation, and approval processes of the Quarterly Progress Reports and the DDP for all three oil shale tracts. The tasks associated with the reports and plans are discussed below.

Baseline Data Report Tasks

Baseline data must be collected over a two-year period during which each Lessee submits to the AOSS at least eight quarterly and two annual progress reports, and at the end of the data collection period, a two-year summary report.* Over this two-year period a total of 33 reports dealing with environmental baseline data must be reviewed and evaluated by the AOSS. It is expected that all Quarterly Progress Reports will be submitted concurrently by all Lessees.

Environmental Monitoring

The Lease and the accompanying Environmental Stipulations provide clear guidance to both Lessee and Lessor on the objectives and specific requirements of the "Environmental Data and Monitoring Program."** The Lease states:

> "(1) The Lessee shall compile data to determine the conditions existing prior to any development operations under the Lease and shall, except as provided below, conduct a monitoring program before, during, and subsequent to development operations, (2) the Lessee shall conduct the monitoring program to provide a record of changes from conditions existing prior to development operations, as established by the collection of baseline data, (3) a continuing check on compliance with the provisions of the Lease (including these attached Stipulations) and all applicable federal, state, and local environmental protection and pollution control requirements, (4) timely notice of detrimental effects and conditions requiring correction, and (5) a factual basis for revision or amendment of these Stipulations pursuant to Section 1(B) hereof."

The monitoring program must begin at least six months prior to commencement of development operations and will continue until the

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*For a description of these reports see section 5.2 of this report.
**Environmental Stipulations, Section 1(C)(1).

"AOSS has determined to his satisfaction that environmental conditions have been established after termination of development operations which are consistent with the requirements of applicable federal and state statutes and regulations."* Where the AOSS has not specified either the environmental characteristics to be monitored or the monitoring procedures, the Lessees may establish their own, subject to the approval of the AOSS. Suggested monitoring programs for air, water, and biology are presented in Appendix I-9 of this report.

4.2.3 Detailed Development Plan Tasks

The Master Milestone Schedule (Figure 4.1) presents the preparation, review and evaluation, and approval process for the Detailed Development Plans. This process must be completed before tract development can begin. Although the AOSS's office need only prepare one DDP guideline for the Lessees, it will have to conduct separate review and evaluation and approval proceedings for each DDP.** The subtasks of the three DDP-related tasks (preparation, review and evaluation, and approval) are detailed below.

Preparation

1. Review of DDP guidelines by OSEAP.
2. AOSS review and incorporation, where appropriate, into DDP of OSEAP recommendations.
3. AOSS to determine what constitutes one year of baseline data collection.
4. Print final form of DDP guidelines.
5. AOSS to determine if the DDP will require an Environmental Impact Statement pursuant to the requirements of the National Environmental Protection Act. He has these alternatives from which to choose:

   Submit a "negative declaration" or an environmental assessment report; or
   Prepare a supplemental EIS; or
   Prepare a site specific EIS.
6. Receive DDP from the Lessee.

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*Section 1(C),(2) of Environmental Stipulations

**Note on the Master Milestone Schedule that, because of different submission dates, the DDP process is staggered. C-b is expected to submit a DDP in November, 1975, C-a between January and June of 1976, and U-a/U-b between March and June of 1976.

Review

1. In-house technical reviews.
2. Prepare an "environmental analysis" of the "environmental provisions" of DDP for purpose of OSEAP and public review.
3. Public review and evaluation.
4. OSEAP review and comments.
5. BLM review where required.*
6. Conduct public hearings.
7. Review OSEAP and public comments by the AOSS.

Approval

1. Review DDP with the regional solicitor.
2. Draft approval decision:
   Incorporate responses and comments obtained during review process.
   Draft a conditional or unconditional approval or disapproval of the DDP.
3. If decision to disapprove is made, Lessee is notified and allowed one year to resubmit an acceptable DDP.
4. If an acceptable DDP is not submitted within one year of Lessee's receipt of notice, Lessee again is notified and allowed one more year to submit an acceptable DDP.

4.2.4 Other Program Tasks and Major Policy Decisions

In addition to the tasks associated with the baseline data reports and the DDP, the AOSS must (1) prepare an "Information Report" for the Chief of the Conservation Division of the Geological Survey and assist OSEAP in preparing the Annual Report to the Secretary;** (2) prepare a justification for AOSS budgets; and (3) make decisions in the following policy areas:

1. Offsettable items.
2. "Due Deligence" interpretation.
3. Determine which program information may be considered proprietary.
4. Determine what constitutes extraordinary environmental costs.***

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*This is in accordance with "Secretarial Order 2948", section 2(a) Appendix I-7.

**See sections 5.2.7 and 5.2.8 of this document for a description of these reports.

***Oil Shale Lease Section 7(d).

5. Determine what constitutes commencement of operations.
6. Determine what constitutes one-year and two-year Baseline Data collection periods.

Timing Issues

It should be noted that the Master Milestone Schedule provides an optimistic estimate of the time that will be required to complete the Pre-Development Phase tasks. Unexpected difficulties in completing any one of the tasks or in deciding or carrying out a policy could delay the approval of any one DDP for months. For example, if it is decided that to fulfill the NEPA requirement a site-specific EIS must be prepared, the additional man-hours required to prepare this would delay the DDP approval process. Furthermore, a delay in any one DDP approval process could cause a scheduling conflict with another DDP approval process (e.g., if public hearings on two DDPs had to be conducted simultaneously). It is these types of potential scheduling problems that give rise to the need for a well-structured management process.

4.3 Part Two: Accomplishment Plan

An Accomplishment Plan is a program planning device that can be used to delegate responsibility, to evaluate program progress and staff performance, and to draw up the AOSS Office budget. The formulation of an Accomplishment Plan is in fact the most important part of the budget-making process and also plays an integral role in administering a management-by-objectives process.* The Accomplishment Plan presented below is an example of one the AOSS might develop for his office. Furthermore, it is an outline Accomplishment Plan in that it does not detail all tasks nor does it completely allocate manpower. The purpose here is to present a format for the AOSS to follow and if necessary expand upon.** Time and resource constraints in writing this report did not permit a complete formulation of an Accomplishment Plan.

4.3.1 Accomplishment Plan Described

The Accomplishment Plan can be developed in four steps: (1) AOSS office manpower is scheduled for the applicable time period;*** (2) Tasks for the period are identified; (3) Tasks are divided into subtasks

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*It's role in MBO will be shown in section 4.4 of this report.

**It is helpful to note that an Accomplishment Plan can be developed to the degree of detail the manager believes is necessary or, to the degree to which resources allow.

***The time period here can be determined by the AOSS. A calendar year, fiscal year, or the Pre-Development Phase period could be used.

(as far as possible) and manpower required to complete each task is assigned; and (4) budgeted (i.e., available) manpower is compared with required manpower.

Manpower Schedule

A typical manpower schedule is a week-by-week table that indicates whether staff members are or are not available for work. Table 4.2 below is an example of a manpower schedule for the AOSS Office. Time in this table is expressed in man-weeks so if, for example, in the first week the mining engineer were available for half a week (20 hours), ".5" would be entered in that block. One day is expressed as ".2", holidays and vacations as "0", and so on. It should be noted that tract coordinators are listed twice in the table: once in their capacity as tract coordinator, and once as a field specialist. Since they divide their time between both functions, double counting of their time should be avoided.

The bottom row in the table indicates the number of man-weeks available each week for all staff. If the AOSS believes it is necessary, a breakdown of man-weeks available by type of staff (i.e., tract coordinator, specialists, etc.) or by tract (C-a, C-b, U-a/U-b) could also be done.

Task Identification

The tasks to be completed over the applicable time period should be identified and listed in their order of occurrence. Section 4.2 above provides this information for the Pre-Development Phase tasks.*

Task Breakdown - Manpower Allocation Table

The purpose of this table is to break down each task into as many subtasks as the AOSS believes is necessary or possible, and then allocate the time of individual staff members to each task. While some tasks (e.g., Quarterly Baseline Data Reports) by their nature are easy to subdivide, others (e.g., Public Hearings) could be quite difficult to subdivide.

Table 4.3 below outlines how the AOSS might break down the Pre-Development tasks. Table rows list tasks and subtasks. In the column named "Task Completion Period" the AOSS should enter the dates when each task is expected to begin and be completed. The next columns

*In particular see the Master Milestone Schedule, Figure 4.1, and Inspection and Meetings Summary, Table 4.1

AOSS OFFICE STAFF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
AOSS																							
DEPUTY AOSS																							
TRACT COORDINATOR, C-a*																							
TRACT COORDINATOR, C-b*																							
TRACT COORDINATOR, U-a/U-b*																							
METEOROLOGIST																							
HYDROLOGIST																							
FLORA-SURFACE PROTECTION																							
FAUNA-SURFACE PROTECTION																							
ENVIRONMENTAL GEOLOGIST																							
GEOLOGIST																							
GEOLOGIST																							
MINING ENGINEER																							
MINING TECHNICIAN																							
AOSS SECRETARY																							
ADMINISTRATIVE ASSISTANT																							
STENOGRAPHER																							
CLERK-TYPIST																							
CONSULTANT SUPPORT																							
PART-TIME SUPPORT																							
TOTAL MAN-WEEKS PER WEEK																							

*N.B. Tract Coordinators divide time between the Tract Coordinator function and the specialist function.

TABLE 4.2
MANPOWER SCHEDULE - AOSS OFFICE

WEEK OF THE YEAR

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	TOTAL WEEKS PER YEAR

list each staff member and the man-weeks each is required to work toward completion of a particular task. These estimates should be provided by the AOSS, his deputy and the tract coordinators.

For example, the First Quarterly Report can be divided into Part I, the Lessees' summary of the report, and Part II, the environmental data. Each tract coordinator will read Part I for substance and scan Part II for extraordinary items or obvious omissions. The staff specialist will then review and evaluate the data in his field for all three tracts. Tract coordinators will compile the specialists' comments and submit the summary to the AOSS for his inspection. It is estimated that each tract coordinator will require one and one-half man-weeks and each staff specialist will require three man-weeks to complete the review and evaluation of this Quarterly Report. The last column on the table indicates the total man-weeks required to complete each task.

Budgeted Versus Required Manpower

After manpower has been allocated to each task and subtask, total man-weeks required for each staff person can be determined. A comparison of required man-weeks with budgeted man-weeks* for each individual will reveal if anyone is over (a deficit) or under (a surplus) allocated for the time period covered. The last three rows of Table 4.3 show for each individual the difference between required and budgeted man-weeks for the applicable time period. The last column of these rows show the difference between required and budgeted man-weeks for the staff as a whole.

It is not enough, however, to consider the manpower budget for an entire time period. Although a manpower deficit in one month could be offset with a surplus in other months so that on paper the manpower budget for the total time period may be balanced, in practice a deficit in one month could upset scheduling for following months. In other words, one deficit man-week may not trade evenly for one surplus man-week. Consequently, the budgeted versus required comparison must be made over a shorter time period.

Since most Pre-Development Phase tasks require one month or more to complete, a one month time period may be sufficiently short. For each month the AOSS will have to determine which tasks have been or are being worked on by AOSS staff. This information can be found in Table 4.3 Task Breakdown - Manpower Allocation, in the column labelled "Task Completion Period". By matching the required man-weeks with

*Budgeted man-weeks for each staff person can be found in the Manpower Schedule Table 4.2.

TABLE 4.3
AOSS OFFICE - OUTLINE ACCOMPLISHMENT PLAN

AOSS OFFICE

OUTLINE ACCOMPLISHMENT PLAN FOR FY--

OUTLINE TASK BREAKDOWN - MANPOWER ALLOCATION

TASKS - SUBTASKS	TASK COMPLETION PERIOD	AOSS	DEPUTY OASS	C-a TRACT COORDINATOR	C-b TRACT COORDINATOR	U-a/U-b TRACT COORDINATOR	METEOROLOGIST	HYDROLOGIST	FLORA-SURFACE PROTECTION	FAUNA-SURFACE PROTECTION	ENVIRONMENTAL GEOLOGIST	GEOLOGIST	GEOLOGIST	MINING ENGINEER	MINING TECHNICIAN	AOSS SECRETARY	ADMINISTRATIVE ASSISTANT	STENOGRAPHER	CLERK-TYPIST	CONSULTANT SUPPORT	PART-TIME SUPPORT	TOTAL MAN-WEEKS REQUIRED
QUARTERLY BASELINE DATA REPORTS																						
1st QUARTER																						
VOLUME 1 - SUMMARY (Review)				1	1	1																3
VOLUME 2 - DATA (Review)							3	3	3	3	3	3	3	3	3							27.0
COMPILATION OF STAFF COMMENTS				0.5	0.5	0.5																1.5
2nd QUARTER																						
VOLUME 1 - SUMMARY				1	1	1																3
VOLUME 2 - DATA							3	3	3	3	3	3	3	3	3							27.0
COMPILATION OF STAFF COMMENTS				0.5	0.5	0.5																1.5
3rd QUARTER																						
(Same as Above)																						
4th QUARTER																						
(Same as Above)																						
DDP TASKS																						
PREPARATION OF DDP																						
IN-HOUSE REVIEW OF OUTLINE DDP																						
REVIEW OF OSEAP COMMENTS																						
POLICY DECISION: ONE YEAR OF BASELINE DATA																						
POLICY DECISION: NEPA REQUIREMENT																						
REVIEW OF DDP - C-b																						
IN-HOUSE TECHNICAL REVIEW																						
IN-HOUSE EAR OR NEGATIVE DECLARATION																						
SUBMIT DDP FOR PUBLIC REVIEW																						
SUBMIT DDP FOR OSEAP REVIEW																						
CONDUCT PUBLIC HEARINGS																						
REVIEW OSEAP AND PUBLIC COMMENTS																						
APPROVAL																						
REVIEW DDP WITH REGIONAL SOLICITOR																						
DRAFT APPROVAL DECISION																						
DRAFT CONDITIONAL APPROVAL DECISION																						

SEE CHARTER (Same as Above)																						
DDP TASKS PREPARATION OF DDP IN-HOUSE REVIEW OF OUTLINE DDP																						
REVIEW OF OSEAP COMMENTS																						
POLICY DECISION: ONE YEAR OF BASELINE DATA																						
POLICY DECISION: NEPA REQUIREMENT																						
REVIEW OF DDP - C-b IN-HOUSE TECHNICAL REVIEW																						
IN-HOUSE EAR OR NEGATIVE DECLARATION																						
SUBMIT DDP FOR PUBLIC REVIEW																						
SUBMIT DDP FOR OSEAP REVIEW CONDUCT PUBLIC HEARINGS																						
REVIEW OSEAP AND PUBLIC COMMENTS																						
APPROVAL REVIEW DDP WITH REGIONAL SOLICITOR																						
DRAFT APPROVAL DECISION																						
DRAFT CONDITIONAL APPROVAL DECISION																						
STAFF MEETINGS AOSS WEEKLY MEETING WITH TRACT COORDINATORS (1 HOUR)		1.2	1.2	1.2	1.2	1.2																
AOSS MONTHLY MEETING WITH ENTIRE STAFF (2 HOURS)		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3			
INSPECTIONS ALL FIELDS OF SPECIALIZATION ONE DAY EVERY TWO WEEKS • • •							1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8			
REQUIRED MAN-WEEKS BY STAFF PERSON LESS BUDGETED MAN-WEEKS BY STAFF PERSON MANPOWER DEFICIT (SURPLUS)																						

TASK PERIOD
(DATES)

BUDGETED MANPOWER

REQUIRED MANPOWER

MANPOWER SURPLUS (DEFICIT)

each time period, a month-by-month schedule of required manpower can be derived from this column. The month-by-month schedule of budgeted manpower can be derived from the Manpower Schedule, Table 4.2. A comparison of these month-by-month schedules will show in which months (perhaps even in which tasks) manpower has been under or over-allocated. Table 4.4 below shows how this table might be organized.

As mentioned previously, in developing the tables of the Accomplishment Plan, the AOSS can decide what degree of detail would best fit his needs. Budgeted versus required manpower comparisons can be made for each staff member or for each task; by month, by quarter, or whatever unit of time measure the AOSS believes is most appropriate. A recommendation of this report is for the AOSS to implement the example used in this section.

4.3.2 Usefulness of the Accomplishment Plan

The usefulness of the Accomplishment Plan depends on how well the AOSS and his staff estimate required man-weeks for each task. Their estimates are based on their knowledge of what work the Pre-Development tasks entail and their familiarity with the skill and productivity of each staff member. As the AOSS Office gains more experience with program operations and with its own capability, estimated manpower requirements will more closely track actual manpower used and the Accomplishment Plan will become a more powerful planning and budgeting tool.

The usefulness of the Accomplishment Plan can be summarized by the following points:

1. It provides a framework for a formalized program planning process;

The AOSS and his staff are forced to schedule tasks to be accomplished and outline what each task entails.

2. It enables the AOSS to more precisely delegate responsibility;

The "Task Breakdown-Manpower Allocation" table identifies the tasks for which each staff person is responsible.

3. It provides staff with evidence of their task responsibility and work schedule;

Staff members need only look at the Task Breakdown - Manpower Allocation table to identify the tasks they are to accomplish and the time expected to complete each task.

4. It enables the AOSS to predict potential problem areas and plan for their resolution;

The "Budgeted versus Required Manpower" tables can be used to identify the time period (e.g., month) in which the manpower scheduled is insufficient to complete the task (i.e., required man-weeks are greater

TABLE 4.4

ACCOMPLISHMENT PLAN
BUDGETED VS. REQUIRED MANPOWER
BY MONTH

	1	2	3	4	5	6	7	8	9	10	11	12
Budgeted Man-Weeks	80	85	87	90	75	85	75	90	90	85	85	75
Required Man-Weeks	70	80	95	95	70	95	85	75	95	80	70	85
Man-Week Surplus (Deficit)	10	5	(8)	(5)	5	(10)	(10)	15	(5)	5	15	(10)

Note: These numbers are for exemplary purposes only.

1	10	11	12
2	9	8	7
3	6	5	4
4	3	2	(1)
5	(11)	1	2
6	2	3	(10)
7	(12)	4	5
8	13	14	(9)
9	(8)	15	16
10	17	18	(7)
11	(6)	19	20
12	21	22	(5)

than budgeted man-weeks). The AOSS should mark not only these time periods but also any time period in which the difference between budgeted man-weeks and required man-week is slight. That is, there should always be slack time in the budget for unexpected problems.

5. It establishes work priorities;

When work schedules become tight or over-extended the AOSS can refer to the Task Breakdown table to establish a priority schedule.

6. It provides the AOSS with a tool to review program progress and staff performance;

The AOSS can compare actual program progress with scheduled progress and compare the tasks individual staff have completed with what they have been scheduled to complete. This is one measure of program and staff efficiency.

7. It can be used by the AOSS to formulate and justify AOSS Office budgets;

Man-weeks multiplied by wage or salary compensations can be translated into budget estimates. The Accomplishment Plan itself can serve as justification for a budget request.

4.4 Part Three: Management-By-Objectives

4.4.1 MBO Currently Applied

The AOSS Office is now administered both informally and formally with a management-by-objectives process: formally in its relationship with the Central Region Office of the Conservation Division; and informally within its own office. Because of the size of the prototype program and the closeness of the AOSS staff an informal or unstructured MBO process can, at this time, effectively administer the prototype program. There are, however, several reasons why a well-structured MBO process ought to be instituted in the AOSS Office.

First, the scheduling of staff time will become more critical when DDPs and additional Baseline Data Reports are submitted for review and evaluation.* During 1976 and 1977 the AOSS Office can expect to

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*The Master Milestone Schedule (Figure 4.1) indicates that the DDPs will be submitted in late 1975 and early 1976; 15 data reports will be submitted in 1975, 18 in 1976, and it is expected that quarterly and annual reports will continue to be required in subsequent years. Assuming that professional staff require four weeks to evaluate each set of three data reports, in 1975, 20 of the 50 work weeks will be devoted to data review alone. This will increase to 24 weeks in 1976, the year in which the DDP review and evaluation proceedings begin, and decrease back to 20 weeks in following years.

be on a tight work schedule. A structured MBO process, through the use of an Accomplishment Plan, enables the AOSS to plan for these critical periods.

Second, many organizations will be monitoring the impact (especially environmental impact) of the prototype oil shale program and would not hesitate to publicize any adverse conditions the AOSS has not noticed, or for which no remedial action has been specified. Well-defined program evaluation procedures - an important part of an MBO process - can guard against these situations.

Third, a structured MBO process requires documentation of program objectives and goals, of the delegation of authority and responsibility, and of program and staff evaluation criteria. This documentation performs two functions: (1) it provides future leasing programs with a well-defined management format that highlights potential problems; and (2) it enables new staff members to quickly adapt to their roles in the AOSS Office.

Finally, and perhaps most importantly, the AOSS Office is well suited for an MBO process. Program objectives have been promulgated by the Secretary and goals (i.e., tasks) have been established. The AOSS need only delegate authority and responsibility and direct the program and his staff toward achievement of the Pre-Development Phase objectives.

The purpose of Part Three of the Management Procedures is to present an MBO process that builds upon the process already in use: adding more definition to the roles of the AOSS staff and further developing review and evaluation techniques. It is expected that as more information about the program tasks becomes available, the MBO process will be expanded both in detail and in degree.

4.4.2 Management-by-Objectives Described

Management-by-objectives is a supervisory device used to achieve a set of long-term program objectives. "The process implies a reliance upon subordinates to accomplish the tasks of cooperative enterprise and an acceptance of the principle that men respond better to the achievement of a few short-range measurable goals than to a long-range target."* The management-by-objectives process has the following characteristics:

1) a clear set of long-term objectives,
2) an integrated set of short-term goals,

*Harold Koontz and Cyrus O'Donnel, Principles of Management, McGraw-Hill, New York, 1968, p. 491.

3) delegation of authority and responsibility,
4) review and evaluation of goals.

The long-term objectives of the organization must be set forth in clear and, as much as possible, quantifiable terms. If objectives are vague or diffuse, subordinates and managers will have difficulty determining if efforts are being directed toward or away from the stated objectives. However, even if long-term objectives are precisely stated, they are by themselves, difficult to achieve. People respond more readily to short-term goals because short-term goals provide them with quick feedback on their efforts and enable them to more easily identify progress or success. Thus, an integrated set of short-term goals should be developed that direct the program toward achievement of long-term objectives.

Once objectives and goals have been established, the manager should next delegate enough authority to subordinates to enable them to use their own discretion in achieving short-term goals. Insufficient delegation of authority results in an underutilization of the subordinates' talents and unnecessary involvement of managers with lower level decision-making. Over-delegation of authority on the other hand, forces subordinates into decision-making roles which are outside their area of expertise and does not allow the manager to adequately control program direction. Although there is no rule for delegating authority, it is directly related to the size of the program and the expertise of subordinates.

In an MBO process the major task of the manager is to meet periodically with subordinates to determine to what degree goals have been achieved, and to evaluate individual effort. At these times, new goals can be established to replace achieved goals, or if achievement is lacking subordinates can be redirected in their efforts.

Another important element to a successful management-by-objectives process is the feeling of team effort or joint responsibility on the part of the manager and his subordinates. This can be accomplished in part by setting objectives and goals with rather than for subordinates, but more importantly it is an attitude of management that must be practiced by the manager.

4.4.3 Management-by-Objectives Applied

Using the four point description of a management-by-objectives process outlined above and the information that is available on the prototype program, a management-by-objectives process for the program can be developed.

Point 1: A Clear Set of Long-Term Objectives

The objective of the Pre-Development Phases is to secure approval of Baseline Data Reports and Detailed Development Plans so that tract development may begin pursuant to the lease.

Point 2: An Integrated Set of Short-Term Goals

Section 4.2 above is devoted to detailing the tasks whose completion will result in the achievement of the Pre-Development Phases objective. The Master Milestone Schedule (Figure 4.1) and the Inspection and Meetings Summary (Table 4.1) identify these tasks, and the Accomplishment Plan further details each task and assigns staff the responsibility for task completion.

Point 3: Delegation of Authority and Responsibility

Along with Point 4: Review and Evaluation, the delegation of authority and responsibility is the most important action the AOSS will perform in implementing an MBO process in his office. Program objectives and tasks have, for the most part, been established by the Secretary, the Oil Shale Lease, and other related documents. The main responsibility of the AOSS is to organize his staff (i.e., delegate authority and responsibility) to insure that tasks are completed and objectives achieved. A prudent delegation of authority and responsibility is based on a thorough understanding of program tasks, and results in an allocation of manpower that effectively resolves or minimizes program problems. A superficial understanding of program tasks can cause a misallocation of authority and responsibility and result in failure to complete program tasks.

The Accomplishment Plan, presented above, provides the basis for a task-by-task delegation of authority and responsibility. A less specific delegation of authority and responsibility is listed below.

AOSS

- Primary responsibility to insure that on-tract activities are directed toward achievement of Pre-Development objectives.
- Decide major policy issues (see Master Milestone Schedule, Figure 4.1).
- Help organize and evaluate staff effort.
- Establish and maintain communication paths with OSEAP, GS, DOI, BLM, and other interested agencies.
- Primary responsibility for preparing the Information Report to the Chief, Conservation Division of the GS.
- Assists OSEAP in preparing the Annual Report to the Secretary.

Deputy AOSS

- Primary responsibility to keep abreast of the legal and technical aspects of the prototype program.
- With AOSS decides major policy issues.
- Assists in expediting approval of Detailed Development Plans.

- Assists in preparing the Information Report and the Annual Report.
- Assists the AOSS in program and staff evaluation.

Tract Coordinators (Three: C-a, C-b, U-a/U-b)

- Interfaces directly with the Lessee on technical (i.e., non-policy) matters in accordance with the terms and conditions of the Lease and appropriate regulations.
- Prepares document review schedules for Exploration Plans, Detailed Development Plans, Baseline Data Reports, and Progress Reports.
- Coordinates document reviews with the AOSS Specialists.
- Collects and combines reviews for follow-on action.
- Attends the AOSS's monthly meetings with the Lessee, and OSEAP meetings as required.
- Coordinates Operations Inspection, Minerals Production Check, Surface Protection and Reclamations Inspection, Inspection of Water and Air Management and Control Measures, Grading and Backfilling Inspection and Planting Inspection.
- Maintains tract specific record books relative to inspections and meetings.
- Advises the AOSS on the acceptability of Lessee deliverables and on site progress, and on recommendations for future oil shale leasing efforts.

Staff Specialists

- Focuses on reviewing Lessee submissions in accordance with Tract Coordinator requests or as deemed appropriate.
- Advises the AOSS and his staff on matters in the fields of hydrology, air meteorology, mining, geology, reclamation, wildlife, habitat, processing, and such other fields as required.
- Conducts on-site inspections as needed to supervise lease activities on his own area of expertise.
- Attends monthly Lessee meetings as necessary by virtue of ongoing tract programs.
- Attends OSEAP meetings at the request of the AOSS.
- Keeps current on latest developments in the appropriate field of specialization.
- Tries to make consistent the guidance given each of the three Lessees.
- Maintains a personal log of meetings attended, important conferences, and site visits as well as updates any office loss maintained by the AOSS.

In addition to the responsibilities associated with current staff members, there are administrative responsibilities to be performed in three areas: document control, public relations, and accounting and finance. The primary responsibilities associated with each area are:

Administrative Support Responsibilities

A. Document Control

- Process all official incoming and outgoing prototype program documentation.
- In a master record book, log current date, title publication date, author, addressee/distribution list.
- Update weekly list of material logged in/out. Copies sent to AOSS and his deputy.
- Distribute incoming Lessee Plans, Reports and Correspondence relating thereto as follows:

Notices of Cessation	to the AOSS
Annual Reports to the Secretary	to the AOSS
Exploration Plans	to the appropriate Tract Coordinator
Detailed Development Plans	
Two-year Baseline Data Reports	
Quarterly Progress Reports	
Annual Progress Reports	to the Staff Accountant
Expense Report, Financial Reports	
Production Reports	
Audits	

B. Public Relations

- Maintain cognizance of regulations, laws, ordinances.
- Respond to external requests for information authorized by the AOSS.
- Generate PR material for distribution to environmental groups, newspapers, state/local offices.

C. Staff Accountant

- Review and evaluate Expense Reports, Production Reports* and Audits

*These reports are available after development and production begin.

- Participate in any inspections of records and books of account relative thereto.
- Review and evaluate the status of rental, bonus, and royalty payment.
- Keep current on the status of compliance bonds.
- Participate in Minerals Production Checks.

It is emphasized again that the Accomplishment Plan, specifically the Task Breakdown - Manpower Allocation table, should be used to assist the AOSS in delegating authority and responsibility. Sound program planning is based on it; the efficient administration of the prototype program may depend on it.

Point 4: Review and Evaluation Procedures

Effective review and evaluation procedures can be used to determine if program objectives are being achieved and to direct staff efforts. Achievement of program objectives and goals can be judged by the following criteria:

1. Compare the tasks completed to date with the completion schedule from the Accomplishment Plan,
2. From the summary reports submitted by tract coordinators and staff specialists ascertain:
   a. the completeness of the data collection effort
   b. whether or not remedial actions specified by tract coordinators have been taken by the Lessees,
3. Compile a list of problems encountered and steps taken by the staff and the AOSS to confront and solve the problem,
4. Adherence by the Lessees to a report submission schedule.

The evaluation of staff could be based on the following criteria:

1. Compare tasks completed with those scheduled to have been completed by the Accomplishment Plan,
2. Staff response to crisis situations occurring on Lease tracts and in office,
3. Response of outside parties to the environmental, economic and technical aspects of the prototype oil shale program.

The main disadvantage in applying a management-by-objectives process to the prototype program is that the evaluation of program progress and staff achievements is difficult to express in quantitative terms. This follows from the fact that the objectives and goals of the program have been expressed qualitatively rather than quantitatively. Consequently, the AOSS will be guided more by his and his staff's subjective

appraisal of the program than by a graph that shows number of reports submitted, inspections made, or meetings attended. By the same token, the AOSS's evaluation of his staff will be primarily a non-technical evaluation, based on adherence to a schedule and performance in the field.

To offset these deficiences the AOSS can use the following management tools:

1. Schedule weekly meetings* with tract coordinators to discuss actions taken by tract coordinators to ensure program objectives, to present projected activities on site, and to evaluate staff performance and if necessary redirect efforts. During these weekly meetings, problems that arise on individual tracts can be compared so that similar problems can be avoided on other tracts in the future, and to determine if other tract coordinators have addressed the problem at all.
2. Schedule monthly meetings** with the Oil Shale Office staff to discuss administrative problems, site activities accomplished, in progress and upcoming and perform staff evaluation.

A final tool the AOSS has at his disposal is the team attitude that has been established among staff members and the AOSS. In this environment, staff members are more receptive to suggestions or critical review offered by other members and are more likely to offer support to a member who is experiencing a scheduling crisis.

The next section discusses management aids the AOSS can use to help organize and run his office.

4.5 Management Aids

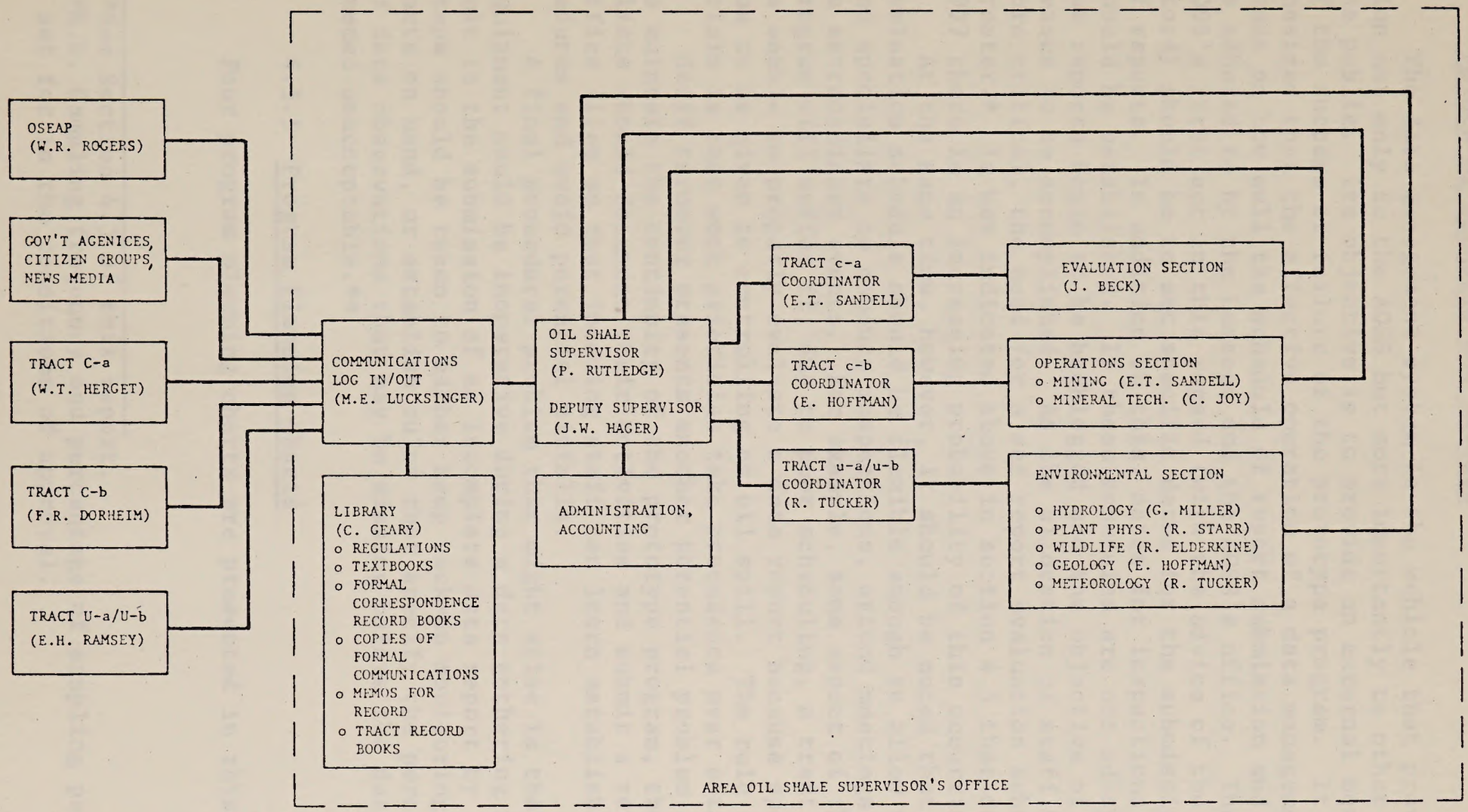
4.5.1 Overview

This section describes the AOSS Office work flow, staff meetings, and presents a data management system and several program schedule charts. The work flow and data management system are both based on Figure 4.2, Formal Communications Paths. A process is presented to receive, review, evaluate, store, and disseminate information submitted

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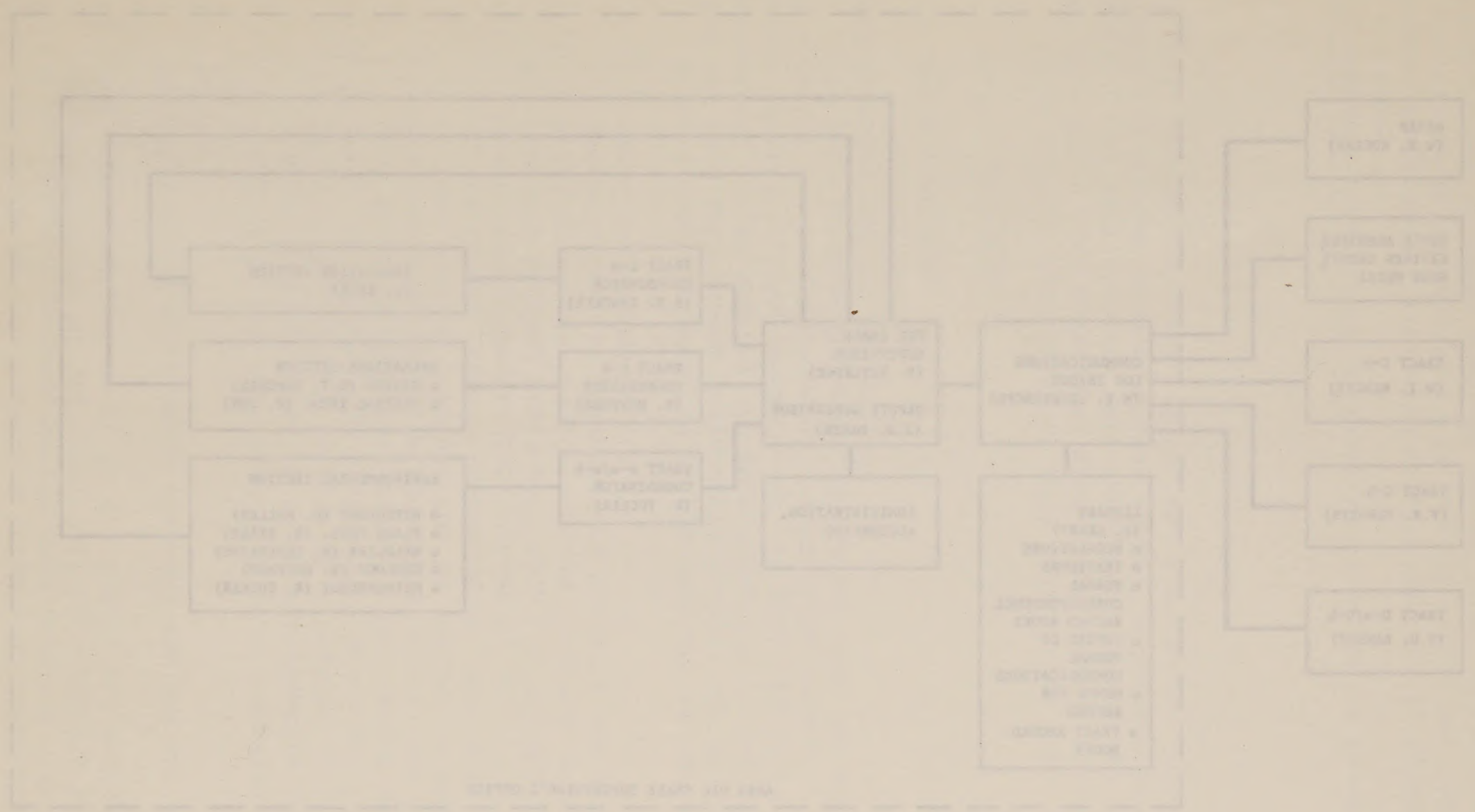
*A complete description of these meetings can be found in Section 4.5 above.

**These meetings are scheduled monthly because it is unlikely that the issues on the agenda would justify weekly meetings. A complete description of these meetings can be found in Section 4.5 of this report.



NOTE: This figure addresses formal workflow i.e., official correspondence, document reviews, document control, etc. AOSS staff personnel are encouraged to deal directly on an informal basis with Lessee personnel and other members of the AOSS staff. Records of these informal communications should be maintained by each member of the AOSS staff. Records of informal communications with Lessee personnel (visits, phone calls, etc.) should also be noted in appropriate books stored in the AOSS library.

FIGURE 4.2
FORMAL COMMUNICATIONS PATHS



Points of Emphasis and Caveats

The data management system is the vehicle that provides information not only to the AOSS but more importantly to other agencies and the public. Its objective is to provide an external manifestation of the success or failure of the prototype program. It should be emphasized that the effective operation of a data management system depends on how well the schedule of report submission and evaluation is adhered to by the Lessees and the AOSS's office. Therefore, the AOSS's first act in this regard (with the advice of the tract coordinators) should be to set specific dates for the submission and evaluation of reports. In addition to this, dates for inspections and meetings should be established. If these schedules are not adhered to, past due reports begin to be backlogged and the objective of the data system ceases to be accomplished. As the allocation of staff time becomes more critical, the need for a set report evaluation schedule becomes greater.* It was indicated above in section 4.3 that during 1976 and 1977 there is an increasing probability of this occurring.

At the same time, however, it should be noted that the report evaluation schedule should be flexible enough to allow tract coordinators and specialists to conduct inspections, attend meetings, and respond to extraordinary events. For example, some aspect of the prototype program will suffer if, due to poor scheduling, a tract coordinator is unable to properly evaluate a data report because special attention has to be given to controlling an oil spill. The rule in a scheduling crisis is that work priorities take precedence over established schedules.

Staff turnover presents another potential problem for the AOSS. To maintain the continuity of the prototype program, the staff specialists should document their activities and submit a report to the office files so that incoming staff can learn established review procedures and avoid potential pitfalls.

A final procedural problem that might arise is that monitoring equipment could be inoperative during a data gathering period and result in the submission of an incomplete data report by the Lessees. Steps should be taken to either keep back-up monitoring equipment or parts on hand, or establish rules that specify the percentage or number of data observations that may be missing before the data report is deemed unacceptable.**

4.5.5 Program Planning Charts

Four program planning charts are presented in this section:

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*See Section 4.3 of this report.

**N.B. Sampling frequency and percentage of sampling period have been set for in the conditions of approval.

(1) Table 4.1 a milestone summary of inspections and meetings to be performed during a calendar year; (2) Table 4.5 a milestone summary of plans and reports to be submitted and evaluated over a four-year period; (3) Table 4.6 a milestone chart for the 20-year oil shale lease term; and (4) Table 4.7 Prototype Oil Shale Project Action Items - 1975.

The "inspections and meetings" and the "action items" tables can be repeated and revised as necessary year-by-year by the AOSS. Similarly, the four-year Plans and Reports Master Milestone Summary can be updated for use in future years.

These tables are designed to inform both the AOSS and outside organizations of what has been done, of what is on-going, and of what is up-coming in the prototype oil shale program. They also serve to indicate to the AOSS if program tasks are being completed on schedule and if not, how far behind schedule they are, and which tracts are involved.

Table 4.6 summarizes the major activities the AOSS Office will be involved in during the 20-year lease term. The function of this table is to place the Pre-Development Phase activities in a time frame so that outside organizations can better understand the more detailed tables. This table can also be revised to reflect changes in the program reporting requirements.

5.0 ACTIVITIES

5.1 General

This section addresses the plans and reports to be prepared, the inspections to be performed, and the schedules involved in accomplishing tasks by the Lessees, the Area Oil Shale Supervisor (AOSS) and the Oil Shale Environmental Advisory Panel (OSEAP). The 20 plans and reports identified in the lease and in 30 CFR 231 and 43 CFR 23 have been reduced in number to 10 by combining documents where feasible. Thus, for example, many separate reporting requirements can be satisfied by the Detailed Development Plan (DDP), the Quarterly Progress Report, and the Annual Progress Report. For inspections, eight major categories were identified in the lease and the two CFR's; although several may be performed simultaneously (on the same site visit, for example), the subjects were deemed to be of such importance that the seven inspections are still called out separately.

Table 5.1 summarizes the plans and reports that are to be submitted under this management plan, the inspections to be performed, and the action office involved. Also shown are the schedules associated with these actions; where possible, the schedules have been keyed to a calendar year basis. Further discussion of each plan, report, and inspection follows.

5.2 Plans and Reports

5.2.1 Exploration Plan

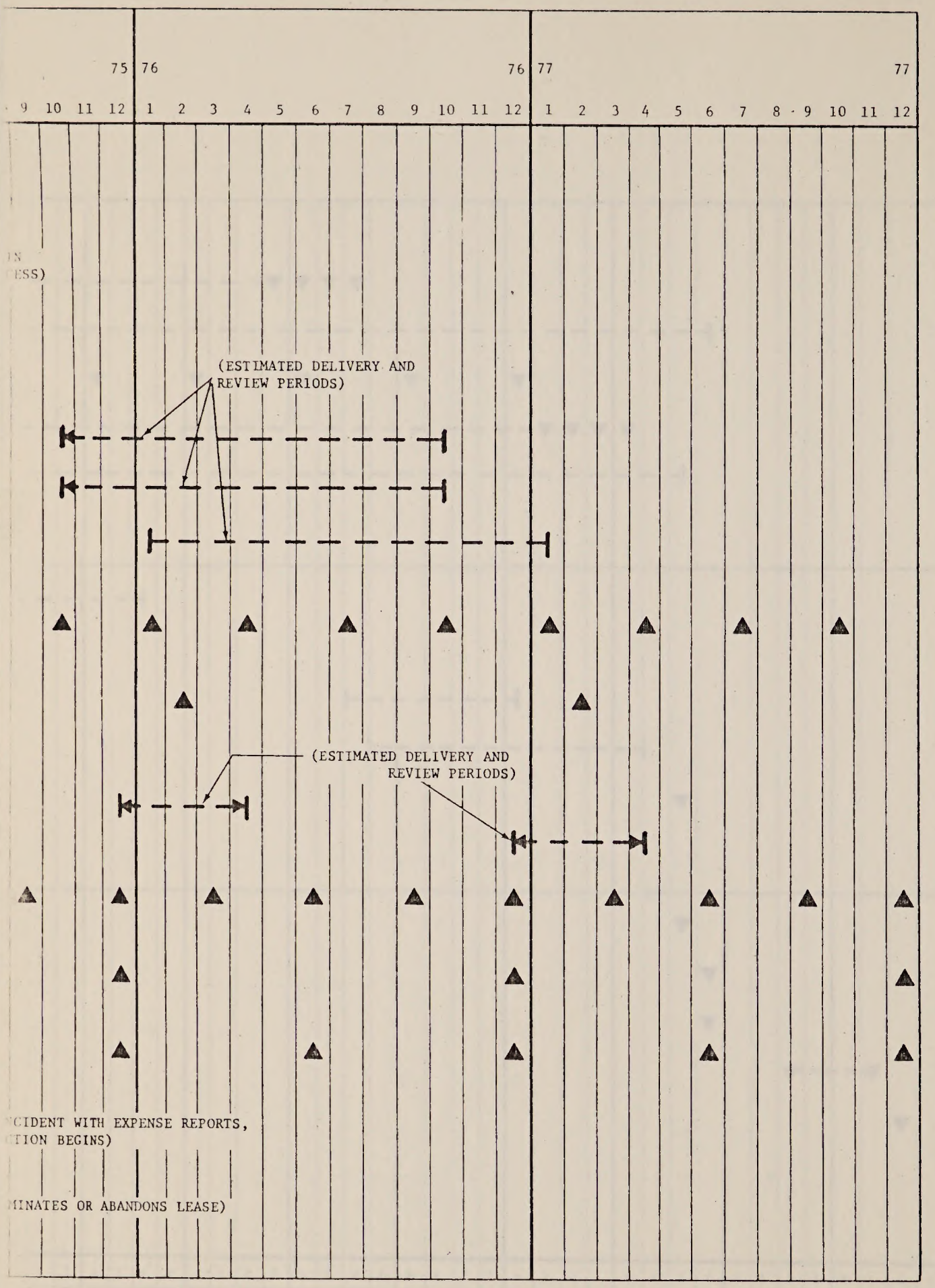
Submission of this plan by each Lessee was required before any exploratory work began. According to the Lease, Section 10(d), "exploratory work ...shall include...seismic work, drilling, blasting, research operations, cross-country travel, the construction of roads and trails and other necessary facilities, and the accumulation of base line data..." The Lessees submitted exploration plans to the AOSS for review and approval by July 1974. To allow the Lessees to proceed with their exploratory work as expeditiously as possible, the AOSS is approving portions of the exploration plans. Changes to the plans to insure conformance with the basic objective of the prototype oil shale program are accomplished through an amendment process instituted by the AOSS. When a Lessee agrees in writing to these amendments, relevant portions of the exploration plans are deemed approved. Table 5.2 shows the portions of the three Exploratory Plans remaining to be approved as of 31 March 1975.

In accordance with Department procedures the AOSS will submit Exploration Plans (or significant amendments, revisions, or supplements to such plans) to the OSEAP for comment prior to AOSS approval.

DOCUMENT	74 1 2 3 4 5 6 7 8 9 10 11 12	75 1 2 3 4 5 6 7 8 9 10 11 12
1. EXPLORATION PLAN		
a. TRACT C-a	▲ – – – – – – – – – – – –	– – – – ▶
b. TRACT C-b	▲ – – – – – – – – – – – –	– – – – ▶ (PLANS STILL IN REVIEW PROCESS)
c. TRACT U-a/U-b	▲ – – – – – – – – – – –	– – – – ▶
2. DETAILED DEVELOPMENT PLAN		
a. TRACT C-a		▶ – –
b. TRACT C-b		▶ – –
c. TRACT U-a/U-b		
3. QUARTERLY PROGRESS REPORT		▲ ▲ ▲ ▲
4. ANNUAL PROGRESS REPORT		
5. BASELINE DATA REPORT (see note 1)		
6. EXPENSE REPORT (see note 1)		▲ ▲ ▲
7. OSEAP ANNUAL REPORT TO SECRETARY	▲	▲
8. AOSS INFORMATION REPORT (see note 1)		▲ ▲
9. PRODUCTION REPORT		(SUBMIT QUARTERLY, COINCIDENT WITH EX WHEN PRODUCTION BEGINS)
10. REPORT OF CESSATION OR ABANDONMENT OF OPERATIONS		(SUBMIT WHEN LESSEE TERMINATES OR ABA

NOTE: 1. ALL DOCUMENTS ARE REQUIRED EXCEPT FIRST YEAR BASELINE D EXPENSE RPEORT AND AOSS INFORMATION REPORT WHICH ARE R

2. ADDITIONAL DOCUMENTATION REQUIREMENTS MAY BE IMPOSED I



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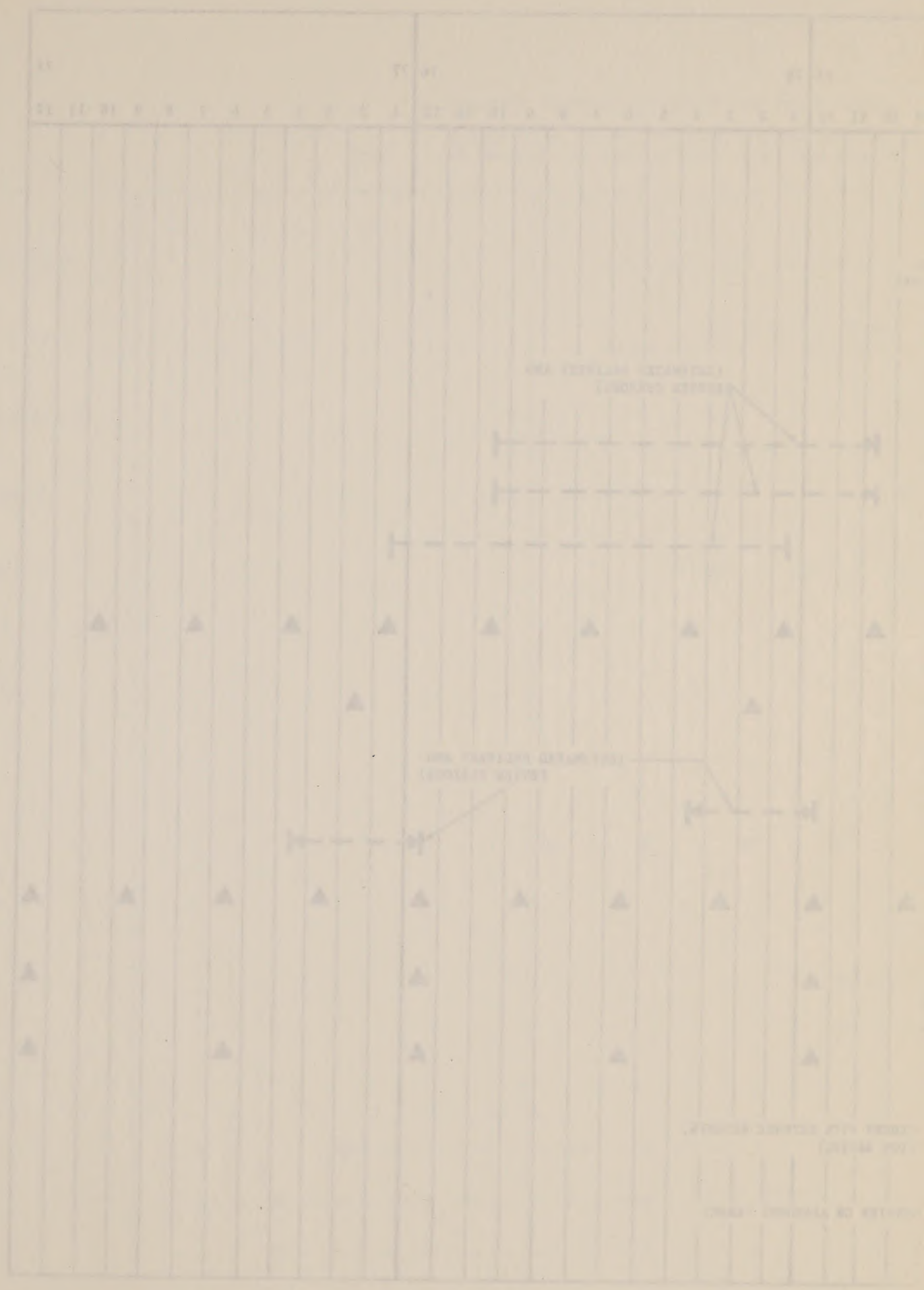
CIDENT WITH EXPENSE REPORTS,
TION BEGINS)

INATES OR ABANDONS LEASE)

EAR BASELINE DATA REPORT,
T WHICH ARE RECOMMENDED.

BE IMPOSED IF THE NEED ARISES.

TABLE 4.5
PLANS AND REPORTS MILESTONE SUMMARY



ACTIVITIES	1971				1972				1973				1974				1975				1976				1977				1978				1979				19	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
1. DEPARTMENT OF THE INTERIOR																																						
PROTOTYPE PROGRAM ANNOUNCED		▲																																				
SIX TRACTS SELECTED						▲																																
ENVIRONMENTAL IMPACT ASSESSED							▲	-	-	-	▲																												
COMPETITIVE LEASE SALES HELD													▲																									
OSEAP ESTABLISHED													▲																									
AOSS OFFICE ESTABLISHED														▲																								
2. PROTOTYPE PROGRAM LESSEES																																						
EXPLORATION PLANS SUBMITTED														▲																								
BASELINE DATA COLLECTION EFFORTS																-	-	-	-	-	-	-	-	-	-	-	-	-										
DETAILED DEVELOPMENT PLANS																								-	-	-	-	-										
TRACT DEVELOPMENT																																						
SHALE OIL PRODUCTION																																-	-	-	-	-	-	-
3. FORMAL MANAGEMENT CONTROLS																																						
MEETINGS WITH THE LESSEES														-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUARTERLY PROGRESS REPORTS														▲	▲	▲	▲	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANNUAL PROGRESS REPORTS																	▲				▲				▲				▲				▲					
OSEAP MEETINGS														-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PRODUCTION & EXPENSE REPORTS																									▲	▲	▲	▲	-	-	-	-	-	-	-	-	-	-
GOVERNMENT AUDITS																																						

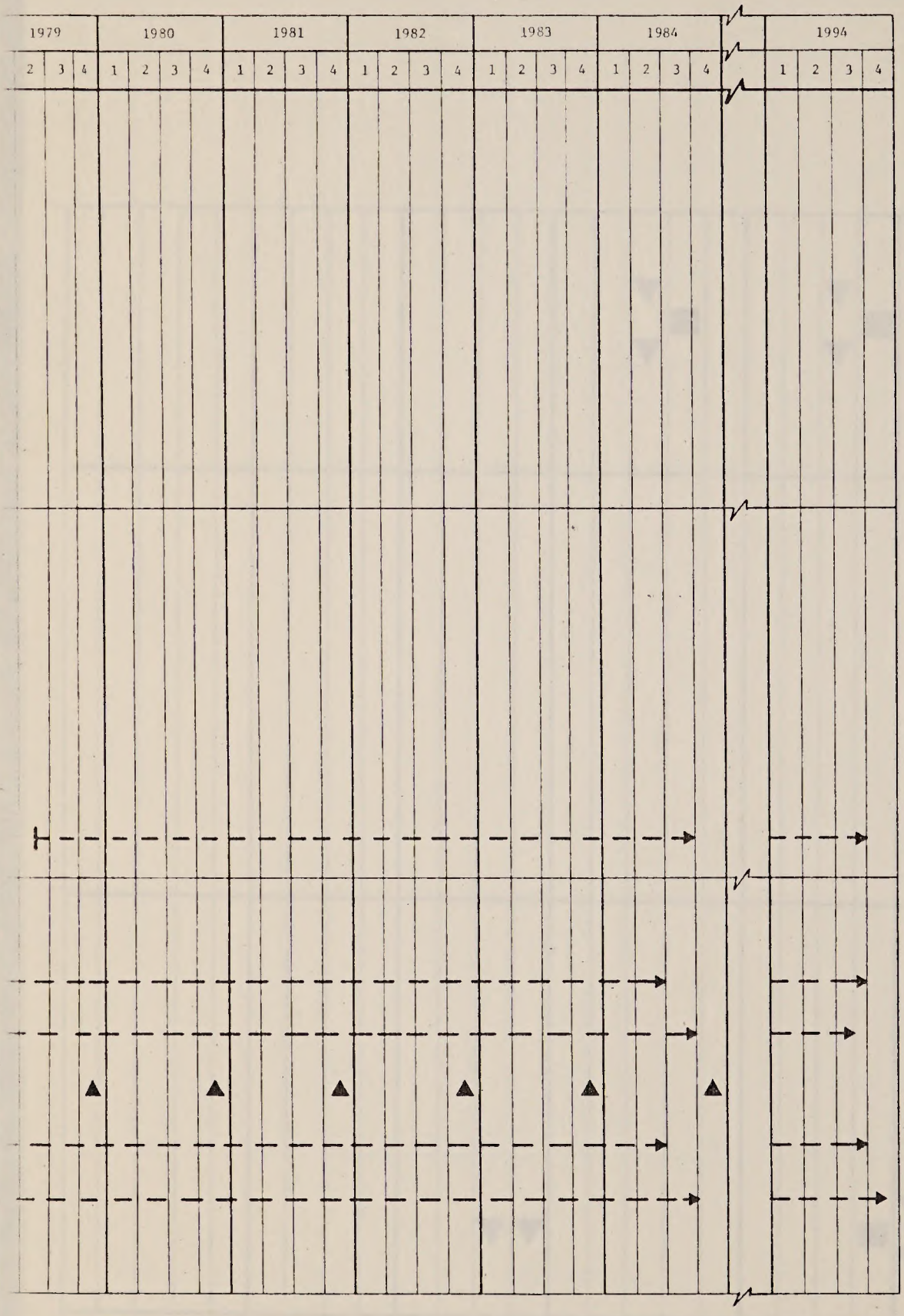
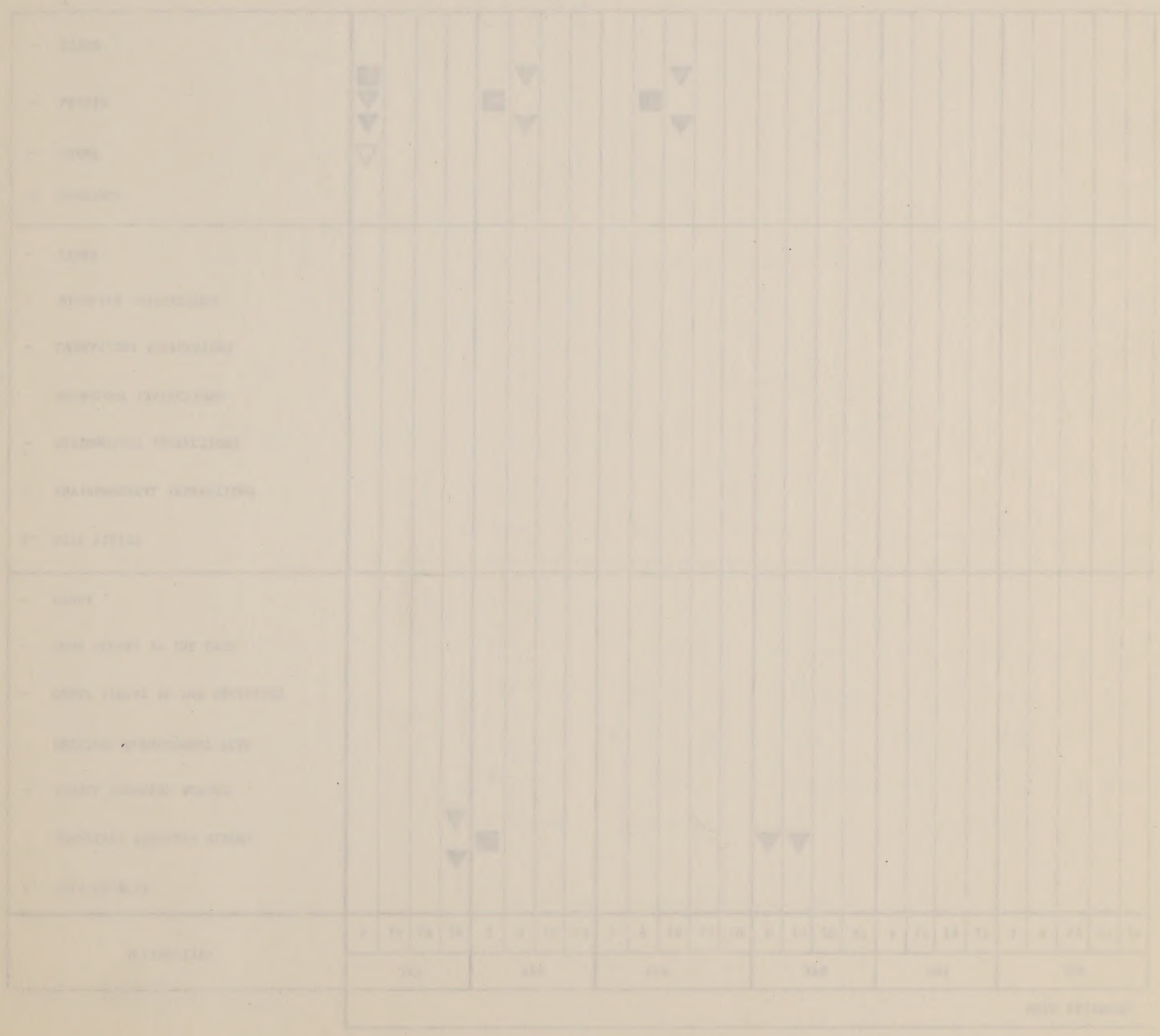


TABLE 4.6
PROTOTYPE OIL SHALE PROGRAM MILESTONE CHART

WEEK BEGINNING

ACTION ITEM	JAN				FEB				MAR					APR				MAY				JUN				
	5	12	19	26	2	9	16	23	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29
A. DELIVERABLES																										
- QUARTERLY PROGRESS REPORT				▲	■									▲	▲											
- ANNUAL PROGRESS REPORT				▲																						
- DETAILED DEVELOPMENT PLAN																										
- OSEAP REPORT TO THE SECRETARY																										
- AOSS REPORT TO THE USGS																										
- OTHER																										
B. SITE VISITS																										
- ENVIRONMENTAL INSPECTIONS																										
- METEOROLOGY INSPECTIONS																										
- HYDROLOGY INSPECTIONS																										
- OPERATIONS INSPECTIONS																										
- WILDLIFE INSPECTIONS																										
- OTHER																										
3. MEETINGS																										
- OSEAP	△																									
- LESSEE	▲ ▲ ■				■	▲ ▲					■	▲ ▲														
- OTHER																										



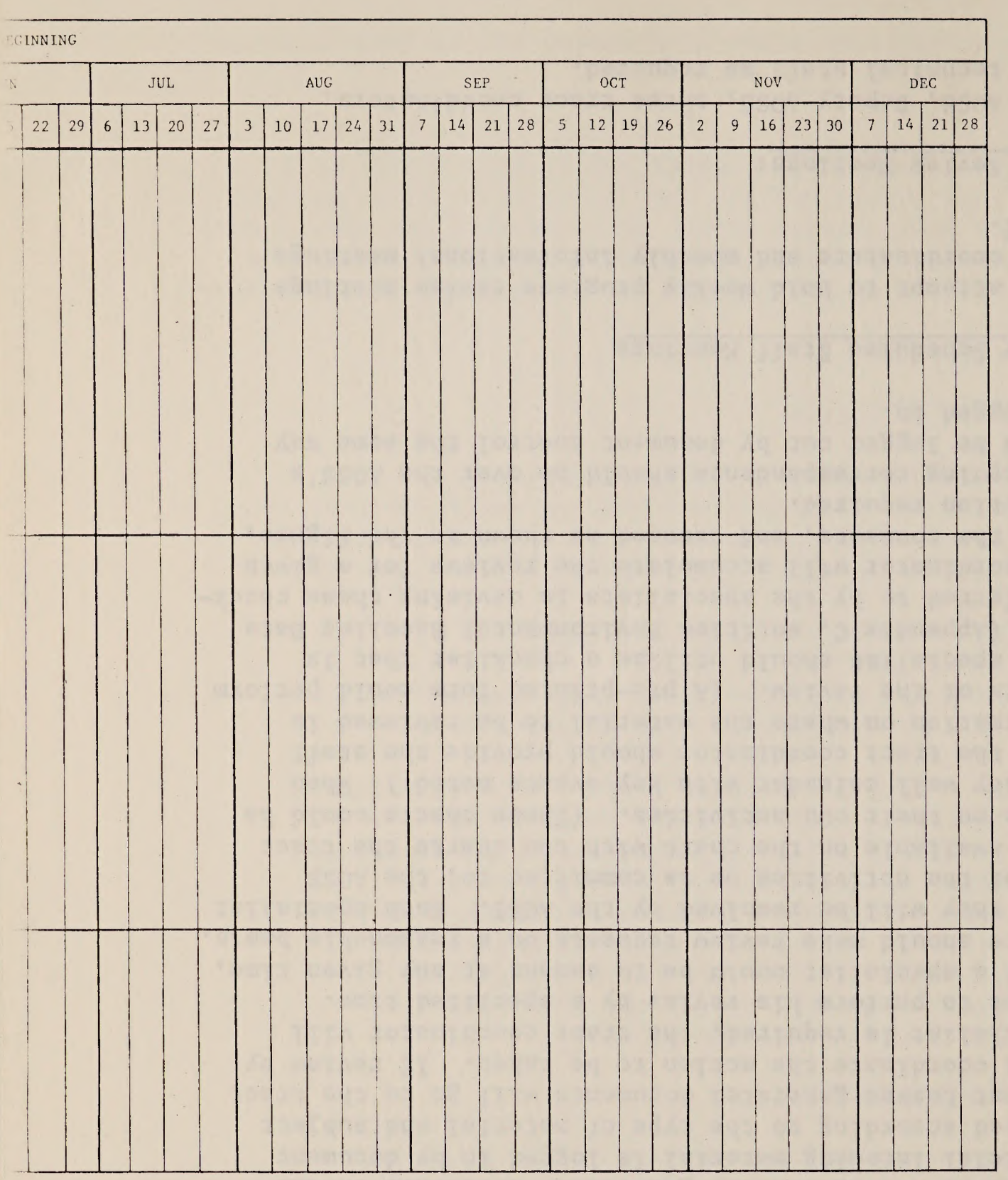


TABLE 4.7
PROTOTYPE OIL SHALE PROJECT ACTION ITEMS - 1975

by the Lessees. Two types of staff meetings are described: technical/ weekly progress meetings involving the AOSS, the deputy AOSS, and the three tract coordinators, and a monthly meeting with the entire staff. The program schedule charts provide both the AOSS office and other interested parties with documentation of program accomplishments and future events.

4.5.2 Work Flow

Figure 4.2 indicates how externally-generated documents should be process. All official incoming material is logged in by document control and distributed according to the type of material and subject matter. As shown, most Lessee-generated documents will go to the tract coordinators who will coordinate the action to be taken. If review by an environmental specialist is required, the tract coordinator will request the specialist to perform his review by a specified time. Since the services of a specialist could be in demand at any given time, the tract coordinators should make review requests on a reasonable basis. When conflicts arise they will be resolved by the AOSS. Each specialist should keep a chart of the activities he is committed to; the AOSS should meld the time available on the chart with the charts the tract coordinators maintain on their own activities. (These charts could be in the form of a 30-day wall calendar with key events noted.) When requesting a review, the tract coordinator should provide the staff specialist with information on where the material to be reviewed is located and the nature of the review. (A pre-printed form could perform this function.) The specialist should utilize a checklist that is keyed to his field. (Appendix C, entitled Environmental Baseline Data Matrix, should be referred to by the specialists in devising these checklists.) The tract coordinator will accumulate the reviews for a given document, coordinate the comments, and proceed as shown in the figure, depending upon the action required.

All official outgoing correspondence should be over the AOSS's signature. It should be logged out by document control the same way that documents are logged in.

4.5.3 Regularly Scheduled Staff Meetings

The AOSS should attempt to hold weekly progress review meetings with the three tract coordinators and monthly informational meetings with his entire staff.

Weekly Progress Review Meetings:

Attendees: AOSS, Deputy AOSS, three tract coordinators, technical staff as required.

Agenda Items: Significant development activities on-tract, document, review status, attendance at future panel/tract meetings, activities of the AOSS, and policy issues that have a general impact on the program.

Time/Place: This meeting should be held the same day and time each week, e.g., every Monday from 9 to 10 am.

Records: The AOSS's secretary should keep an official record of each meeting, logging the items discussed and the actions agreed upon.

Monthly Informational Meetings

Attendees: The AOSS and his entire staff.

Agenda Items: Accomplishments during the last month, forecast for the next month, highlights of tract activities, highlights from the AOSS's schedule, feedback from USGS superiors, items of national and local issue that impact on oil shale, administrative procedures that need strengthening, any relevant issues the staff may wish to raise, items of critical nature.

Time/Place: This meeting should also be held on the same day each time (last Friday of the month 2 to 3 pm).

Records: No records need to be maintained.

It is recommended that the AOSS, Tract Coordinators, Specialists, and other AOSS staff members be encouraged to meet whenever the need arises. The staff is small, and reactions must be swift, so that informality in working relationships is highly desirable.

4.5.4 Data Management System

Information Flow Defined

A major responsibility of the AOSS is to evaluate the environmental and operational aspects of the prototype program. To facilitate this evaluation the Lessees periodically submit environmental and operational data reports to the AOSS, which include the following: the Quarterly and Annual Progress Reports, the Investment and Expense Report,* the

*These reports will be submitted after development and production begin.

Production Report, and financial reports. The Plans and Reports Milestone Summary Tables show the schedule for the submission of these reports.

These data reports must be collected, reviewed and evaluated, stored, and disseminated by the AOSS. Thus, there arises a need for a data management system that will direct the flow of information and set a schedule of submission and review for the Lessees and the AOSS respectively. Figure 4.2 above shows how information should flow through the AOSS's office.

The primary task in data management will be to review and evaluate data the Lessees submit in time for dissemination to interested parties. The Annual Report to the Secretary (prepared with OSEAP) and the Information Report* (prepared every six months) are examples of report the AOSS must prepare for dissemination.

Description of the Data Management System

All reports the Lessees submit are logged in as received and the AOSS and deputy AOSS are notified by the log in/out staff person of what documents have been received. Copies of all documents are submitted to the AOSS library and to the respective tract coordinators. Each tract coordinator will organize each report according to type of data and transfer the data to its corresponding specialist. For example, air quality data will be transferred to the meteorologist, water quality data to the hydrologist, and so forth. Once the specialists have reviewed the data and have indicated missing or inaccurate data and data trends that violate environmental standards, they send a summary report to each tract coordinator, to the office library, and to the AOSS. Any problems that arise from the data review should be brought to the attention of the tract coordinators before the Lessees are approached. This is to ensure that the tract coordinators are kept abreast of all information and to prevent unauthorized decisions from being made. This does not mean that all data related problems require the tract coordinators personally to interface with the Lessees. In many instances, the specialists might only communicate to the tract coordinator by phone his intention to discuss a data problem with the Lessee's specialist. The tract coordinator need only intervene in the event of extraordinary data problems. After the specialists report back to the tract coordinators, summary reports for each tract are prepared by each tract coordinator and submitted to the AOSS and the office library. Any requests for these reports, by the OSEAP, Lessees, federal, state, and local agencies, or the public must be made through the AOSS. He is best qualified to judge the expediency of allowing a particular person or entity to view these reports.

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*See Sections 5.2.6 and 5.2.7 for a discussion of the form and content of these reports.

The contents of the Exploration Plans address the following work areas:

- Surface and ground water
- Soils survey and productivity analysis
- Air quality and meteorology
- Flora and fauna
- Special environmental studies (noise, archaeology, scenic values)
- Fish and wildlife management
- Erosion control and surface rehabilitation
- Support roads and facilities
- Revegetation

5.2.2 Detailed Development Plan

Submission of this document to the AOSS for review and approval is required before any development work begins. According to the Lease, Section 10, the plan is to be submitted prior to the third Anniversary Date (March 1977 for the Colorado leases, June 1977 for Utah) and is to include a schedule of proposed operations, a description of the procedure to be invoked to protect the environment, and a statement of due diligence in attaining production at an early time. Since the Lease, Section 5, allows development costs (other than plan preparation) to be credited against the bonus payments due on the fourth and fifth Anniversary Dates, it is to the Lessees' advantage to obtain early acceptance of their plans. According to the Lease Environmental Stipulations, Section 1(c)(1), a Lessee must accumulate one full year of baseline data before submitting his plan. At issue is how literally Section 1(c)(1) should be interpreted; it is recommended that the AOSS advise the Lessees that Detailed Development Plans may be submitted after one year of continuous monitoring according to approved baseline data collection plans for all parameters called for in accepted plans.

Like the Exploration Plan, this plan (DDP) will also be submitted to the OSEAP by the AOSS before he approves it. Unlike the Exploration Plan, however, the Detailed Development Plan must undergo public hearings. According to 615 chapter 3, Section 8 of the Department of Interior's Manual, the AOSS "shall hold a public hearing on the environmental aspects" of the plan. The OSEAP is to assist in conducting the hearings.

Many of the plans and reports required of the Lessees by the Lease and by 30 CFR 231 and 43 CFR 23 have been included as major sections in the Detailed Development Plan. These plans and reports are shown in the outline for the plan below. Covering the three major areas of activities during the 20 year Leasehold period (development, operations, and cessation), the plan addresses the following topics:

- Transportation corridor plans (roads, pipeline, utilities)
- Fish and wildlife management plan

- Cultural investigation report
- Spill contingency plans (oil and hazardous materials)
- Erosion control and surface rehabilitation plan
- Pollution control
- Rehabilitation
- Revegetation Plan
- Mining plan
- Environmental monitoring program
- Baseline data report
- Processing and upgrading
- Overburden disposal
- Spent shale disposal
- By-products management
- Tract construction
- Manpower requirements (recommended addition)
- Schedules of activities (recommended addition)
- Environmental controls (air/water/noise pollution, health and safety, fire prevention)

5.2.3 Quarterly Progress Report

The Lease provides that the AOSS may request that reports on baseline data and environmental monitoring data as well as on activities of the Lessees on the tracts be submitted. The AOSS has directed each Lessee to submit a progress report covering these items on a quarterly basis. To conform to a schedule which is consistent with seasonal activity for environmental baseline data, these reports cover the periods 1 December-28(29) February, 1 March-31 May, 1 June-30 August, 1 September-30 November. The first report submitted by the Lessees covered the time from the effective dates of the leases to 30 September, 1974 (C-a), and to 30 November, 1974 (C-b, U-a/U-b). The next report covers the months through 28 February, 1975. Table 4.5 shows all plans and reports on a master milestone summary; the Quarterly Progress Report is shown to be received by the AOSS within 45 days of the close of the reporting period.

Each Quarterly Progress Report consists of two parts. Part one is a summary of the work for the quarter. It is designed for wide distribution among those in government and the private sector. Appendix F lists the recipients. The second part of the report discusses the work performed and contains all data from the baseline monitoring program. Since these data are voluminous and in certain instances are company confidential, distribution is restricted. It is recommended that two copies of the second part be submitted to the AOSS. One copy should be kept intact by the AOSS and access limited to those with a need-to-know in accordance with lease terms and departmental regulations pertinent to the handling of proprietary information. The second copy should have all proprietary information deleted so it may be made more readily available for routine AOSS office work

as well as shown to interested parties who do not have a need-to-know.

The formats for both parts of the Quarterly Report have been designed to accelerate review by the AOSS, OSEAP, and other interested parties by using ring/post binders, stand-alone sections, etc.

It is recommended that this report address the following topics:

Sect. 1 Work Progress for Quarter
- Site activity (projects begun, completed)
- Problems encountered
- Core drilling status
- Environmental baseline data collection status
- Fiscal activities
- Manpower (contracts, personnel)
- Schedule of work (short term, long term)

Sect. 2 Environmental Data Collection and Reporting
- Air quality
- Meteorology
- Surface Water Quality and Hydrology
- Ground Water Quality and Hydrology
- Biology (flora, fauna, ecosystem)
- Soil
- Noise
- Seismicity
- Archaeology
- Aesthetics
- Core drilling (assays, logs, tests, samples, rock mechanics)
- Reclamation and revegetation
- Fish and wildlife management

5.2.4 Annual Progress Report

43 CFR 23 requires each Lessee to submit an operations report annually to the AOSS (see Table 4.5). It is due at the end of each year. The Lease requires a progress report to be submitted annually on a lease year basis. Since the material contained in each report is similar and is reported for the same purpose, the two reports have been combined. To be consistent with other documentation requirements, it is recommended that the report be submitted on a calendar year basis (see Table 5.1).

Unlike the Quarterly Progress Report, this report can be a single volume. In content, it conforms to the topics presented in Part 1 of the Quarterly Report but it summarizes the material for the entire year. None of the material in the Annual Report is classified, and it is given wide distribution according to the list in Appendix I-6

In general, the Annual Progress Report describes the operations performed on the leasehold during the period of time for which the

report is filed. It is recommended that the report address the following topics:

- Work completed/on-going/begun this year
- Environmental baseline data collected and trends described
- Environmental monitoring program data collected & trends described
- Drilling operations
- Fish and wildlife management
- Milestone chart update
- Future activities
- Manpower (subcontract, staff)
- Expenditures

5.2.5 Two-year Baseline Data Report

Required of each Lessee by the Lease Environmental Stipulations, Section 1(c)(2), this is a report on the baseline data collected for a period of at least two consecutive years. Section 1(c)(1) of the Lease Environmental Stipulations gives the AOSS the option to prescribe when records of baseline data and subsequent monitoring are to be submitted. It is recommended that a baseline data report be submitted at the end of one full year's accumulation of data. A report on two full years' accumulation of data is required by the Lease Environmental Stipulations, Section 1(c)(3). Table 5.1 indicates when the two-year report should be submitted to the AOSS.

The two year report will be reviewed by the OSEAP prior to AOSS approval since it specifies each lease tract's environment prior to development activity. Data from the environmental monitoring program effort for each tract will be compared with the baseline data to determine the environmental impacts of oil shale leasing activities. It is thus imperative that each two-year Baseline Data Report be comprehensive and provide a meaningful set of baseline information.

It is recommended that the following topics be addressed in the report:

- Air quality and meteorology (including visibility)
- Surface water quality and hydrology
- Ground water quality and hydrology
- Biology (flora, fauna, ecosystem)
- Soil
- Noise
- Archaeology
- Aesthetic and cultural features

5.2.6 Accounting/Financial Review

The justification for an Accounting/Financial Review can be found in the stated objectives of the prototype program, in the terms and

conditions of the Lease, and in general principles of good management.

The Secretary of Interior has stated that an objective of the prototype program is to determine the commercial viability of oil shale mining. To attain this objective it is recommended that the AOSS require that independent audit be performed of the financial statements of the Lessees. These statements should include as a minimum: balance sheet, income statement, and sources and uses of funds statement. These statements should conform to generally accepted accounting principles applied on a consistent and fair basis.

In addition to financial reporting, the Lessees are required by the Lease* to submit an investment and operating expense report and quarterly production reports to the Lessor. The Lessor will use these reports to determine the royalties due and to apply offsetting credits.

It should be noted that the income statement and sources and uses of funds statement provide investment and operating expense information on an annual basis. This information will probably be needed more frequently, hence the justification for a separate investment and operating expense report.

Section 14.0 of the DDP Outline submitted by MITRE recommends that a schedule of capital costs (i.e., sources and uses of funds and investment and expense reports) be submitted on a regular basis; the schedule would address the following:

- Mine complex
- Processing sequence and major individual steps
- Overburden and waste disposal
- Access and communications
- Transportation

To be consistent with the due dates for the Production Report discussed below, for which quarterly reporting is required, the investment and expense report is also to be reported on a calendar quarter basis (see Table 5.1). In addition to these responsibilities, the Lease requires the Lessor**to collect bonus and rental payments and determine the amount of the general bond and the compliance bond, applying them whenever necessary to ensure performance by the Lessees.

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*Section 16(a), (b)

**The Lease defines the Lessor as the United States of America acting through the Secretary of the Interior.

Upon commencement of mining operations the responsibilities pertaining to the collection and/or determination of royalties, rents compliance bonds and bonus payments transfer to the AOSS from the Lessor. In addition to these responsibilities, the AOSS must also attend to the financial administration of his office. As a minimum, this will require the AOSS to submit annual budget estimates to the U.S.G.S., to determine the projected commercial viability of oil shale mining, to administer the financial terms and conditions of the Lease, and to administer the financial matters of the Oil Shale Office.

It is recommended, therefore, that an accounting/financial function be established in the Oil Shale Supervisor's Office to coordinate these financial responsibilities of the prototype program.

5.2.7 Annual Report to the Secretary

This report satisfies two reporting requirements: a production status report called out in 30 CFR 231.3 and a report to the Secretary imposed by Section .5A(7) of 615 DM. The former requires that the AOSS report to the Chief, Conservation Division of the Geological Survey, on the condition of lands under lease and the manner in which operations are conducted. The frequency of this report is not specified. In the DOI Manual, the Chairman of the OSEAP shall "direct the preparation of the annual report to the Secretary on the environmental aspects of the prototype oil shale leasing program and on the status of exploration and development activities." Since these reports contain the same information, it is appropriate that they be combined. It is also appropriate that prime responsibility for preparing the document reside with the OSEAP Chairman, with the AOSS assisting. The Quarterly Progress Reports and the Annual Progress Reports from the Lessees provide much of the background material for the Annual Report to the Secretary. Subjective evaluations of the adequacy of activities by the Lessees are furnished for this report by the OSEAP and the AOSS.

Since the OSEAP is chartered on a calendar year basis (with two year terms), the annual report covers a calendar year. It was recommended above that the Annual Reports from the Lessees be submitted on a calendar year basis. Allowing a reasonable preparation time and AOSS review time, it is observed that Annual Reports from the Lessees could be available to the OSEAP for its Annual Report to the Secretary in the January-February time period. Quarterly Reports (submitted on a seasonal quarter basis), informal reports from the OASS and the meetings of the OSEAP should serve to keep the information input to the Annual Report to the Secretary reasonably current.

It is recommended that the Annual Report address the following topics:

1. Site-specific development activities (significant projects begun, completed, on-going this reporting period)

(a) Status of the environmental baseline data program
(b) Status of the environmental monitoring program
(c) Significant achievements
(d) Significant problems encountered
(e) Site-specific evaluation
(f) Milestone schedule up-date

2. Regional impacts of the oil shale program

(a) Socio-economic
(b) Water management
(c) Air management
(d) Fish and wildlife
(e) Other environmental considerations

3. Governmental activities related to oil shale

(a) State and local
(b) Department of the Interior
(c) EPA
(d) Other agencies

4. Activities of the OSEAP

(a) Panel representation
(b) Meetings held, studies performed

5. Summary of the prototype oil shale leasing program

5.2.8 Information Report

30 CFR 231.3 specifies that the AOSS submit a report to the Chief, Conservation Division of the Geological Survey, containing "information and recommendations for protecting the minerals"; the regulation does not specify the frequency of this report, leaving it to the AOSS. It is recommended that it be prepared twice a year, preferably in June and December. This schedule fits in well with the time the AOSS must allow for reviewing contractor submissions, conducting on-site inspections, and attending periodic OSEAP/Lessee meetings. (See Table 4.5, the Plans and Reports Milestone Summary.)

The purpose of the Information Report is to permit the AOSS to go on record with a personal evaluation of the prototype program. The focus of other reports like the Annual Report to the Secretary and the Lessee-generated Annual and Quarterly Reports is historical; the focus of the Information Report is prospective with emphasis on the direction follow-on oil shale leasing should take.

In general it is recommended that this report address the following topics:

- Adequacy of laws and regulations
- Adequacy of lease terms
- Areas of concern (agency interest, governmental interests, public interests)
- Staffing issues (sufficiency of legal, technical, financial, administrative support)
- Due diligence on the part of the lessees
- Major lessons learned (environmental, construction, production)

5.2.9 Production Report

According to the Lease, Section 16(a), the Lessee shall submit the report on a quarterly basis to the Lessor. As set out in the lease, the report shall address:

- Amounts of minerals or products produced
- Methods of production
- The character and quality of the products
- Amounts of products disposed of
- The prices realized
- The amounts in storage and/or held for sale

This report, like the Expense Report, is not subject to inspection without the consent of the Lessee (per 615 DM 3.9). It is recommended that this report be submitted to the AOSS on a calendar quarter basis.

With the Expense Report, the Annual Report to the Secretary, and the Information Report, the Production Report provides a firm basis for determining the technical and commercial feasibility of an oil shale leasing program.

5.3 Inspections

This section describes eight inspections 30 CFR 231 and 43 CFR 23 impose upon the AOSS. Two of the inspections require twice monthly tract visits; it is assumed that they can be performed simultaneously. Three of the inspections are performed periodically depending upon a notice given by a Lessee. The three remaining inspections deal with Lessee books of accounts; for one, the audit, the AOSS will require specialized accounting support.

Many ad hoc inspections will probably be performed by various state and local citizens as well as federal officials. It is imperative that the AOSS perform his required inspections vigorously so that issues raised during ad hoc inspections do not come as a surprise to him. In this regard, Lessees should list in their Quarterly Progress Reports all official visitors during the reporting period.

Table 4.1 above contains a schedule of the inspections projected over a year's time. Table 5.3 summarizes the inspections, the authority

SUMMARY INFORMATION ON INSPECTIONS

INSPECTION	AUTHORITY	SPECIFIED FREQUENCY	TEXT REFERENCE
Operations Inspection	30 CFR 231.3(c)(1)	"frequently" recommended twice monthly	5.3.1
Air/Water Management Inspection	30 CFR 231.3(e)	not specified recommend twice monthly	5.3.2
Minerals Production Inspection	30 CFR 231.3(c)(5)	not specified (recommend monthly record checks)	5.3.3
Rentals/Royalties/Bonding Inspection	30 CFR 231.10	monthly for royalties, yearly for rentals, bonding as required	5.3.4
Grading and Backfilling Inspection	43 CFR 23.10(c)	as activities are completed by lessee	5.3.5
Planting Inspection	43 CFR 23.10(d)(2)	after each full growing season	5.3.6
Surface Protection and Reclamations Inspection	30 CFR 231.3(c)(7)	upon receipt of lessee's notice to cease or abandon operations	5.3.7
Audits of Accounts and Books	30 CFR 231.62	annually	5.3.8

for such inspections, frequency of inspections, and the section in the management plan the inspections are referenced.

The following sections describe the types of inspections to be performed by the AOSS. Where a frequency of inspection is not precisely defined recommendations are submitted. Records of all inspections should be kept up to date in tract specific inspection books stored in the library.

5.3.1 Operations Inspection

This inspection is required by 30 CFR 231.3. Its purpose is to insure that the terms of the lease and the requirements of the Exploration/Detailed Development Plans are complied with. The focus of the inspection is to prevent waste of minerals or damage to other resources effected by the operations. Typical areas of interest during the inspection would be overburden processing, mining, shale processing, waste disposal, roads, pipelines, construction, fire control, security, scenic values, revegetation, wildlife management, and so on. It is recommended that this inspection be performed on an average of two times per month.

Primary responsibility for conducting this inspection on a given tract rests with the tract coordinator in the AOSS office. However, the specialist involved will determine when the inspections are to be made and the need for specialized assistance from other members of the AOSS staff. There should be set up a Tract Operations Inspection Record Book for logging the results of the inspections, noting potential problem areas, and for recording any action that has been initiated as a follow-up to these inspections. This Record Book should be kept in the AOSS library.

5.3.2 Air/Water Management Inspection

This inspection is required by 30 CFR 231.3. It supplements the activities examined under the Operations Inspection. According to the regulation, the AOSS must examine "exploratory and mining operations to determine the adequacy of water management and pollution control measures for the protection and control of the quality of surface and ground water resources and the adequacy of emission control measures for the protection and control of air quality."

This inspection should also be conducted on an average of two times per month. (However, as with the Operations Inspection, the activities going on at the site will determine the criticality of this inspection. During initial development, the inspections should be more critical than when production has begun, for example.)

The tract coordinator should have prime responsibility for conducting this inspection; whenever the services of AOSS staff specialists from the Environmental Operations and/or Evaluations Sections are required, the specialists involved will determine when the inspection should be performed.

Records of these inspections should be maintained in an Air/Water Management Inspection Record Book. This book will serve as an informal log of the Lessee's air/water activities. Like the Operations Inspection Record Book, this book should be kept in the AOSS library.

5.3.3 Minerals Production Inspection

Also required by 30 CFR 231.3, this inspection focuses on the minerals produced by the Lessee. It is recommended that the AOSS require that records of production be submitted by the Lessee on a monthly basis. (According to Lease Section 7(b), each Lessee will maintain books in which the weight and quantity or quality of oil shale produced is entered.) They will be checked so that the AOSS can be advised concerning the adequacy of royalties payments made by the Lessee. It is recommended that the AOSS delegate this checking to a staff member for all tracts so that tract coordinators are diverted from their technical concerns as little as possible.

5.3.4 Rentals/Royalties/Bonding Inspection

As with the Mineral Production Inspection, this inspection is levied on the AOSS to ensure that the Lessees are making their rental and royalty payments on time and in the correct amounts and that they are adequately bonded. Rental payments as shown in Appendix I-4 are paid in advance on the Anniversary Dates at the rate of 50 cents per acre. They are credited against royalty payments. Royalty payments, however, are based upon a more complicated schedule that is tied to the amount of shale oil obtained per ton. Royalties are also due on minerals other than shale oil produced from the leased deposits. Bonding requirements are fixed for various aspects of a Lessee's work; however, bonds may be released at the option of the AOSS.

The AOSS must also delegate this inspection to a staff member who has a minimum of technical responsibilities, preferably the same one who is checking minerals production records. Royalties are payable monthly, so that production and payment records must also be checked monthly. This process will also support the AOSS's efforts in regard to keeping track of extraordinary costs that may be offsettable against royalties.

5.3.5 Grading and Backfilling Inspection

This inspection, although required by 43 CFR 23.10, is one that the AOSS would perform anyway. Whenever the Lessee completes grading and backfilling in accordance with his Detailed Development Plan or Exploration Plan, the Lessee makes a report to the AOSS. The tract coordinator will perform the inspection, assisted by whatever AOSS specialists he feels are necessary. This inspection can be conducted simultaneously with visits to the tract for other inspections.

5.3.6 Planting Inspections

As with the previous inspection, the Planting Inspection is required by 43 CFR 23.10; but, it is also a task that the AOSS office would want to perform anyway. It is performed by the AOSS staff specialists at the request of the tract coordinator. The specialist will perform the inspection after the Lessee has reported that the planting set out in his Detailed Development Plan or Exploration Plan has been accomplished. The inspection should be made after the completion of the first full growing season (appropriate to the plants involved) and will focus on whether a satisfactory growth has been established. The specialist(s) will provide the tract coordinator with the results of the inspection and the need for additional effort, if any, by the Lessee.

5.3.7 Surface Protection and Reclamations Inspection

Required by 30 CFR 231.3 upon receipt of a Lessee's notice of interest to cease or abandon the leasehold, this inspection is performed by the AOSS to determine whether the terms and conditions of the lease have been complied with and when the lands have been properly conditioned for abandonment. This inspection should directly be supervised by the Oil Shale Supervisor since it may involve consultation with organizations at the federal, state and local levels and will entail a quick reaction effort by the AOSS staff.

5.3.8 Audits

Per 30 CFR 231.62, an audit "may be made annually or at such other times as may be directed by the (AOSS), by certified public accountants, and at the expense of the Lessees." Personnel on the AOSS staff that are responsible for the Minerals Production Inspection and the Rentals/Royalties/Bonding Inspection should be in the best position to oversee the annual audits and to recommend whether the AOSS should impose additional audits.

Standardized procedures should be followed in selecting the firm to do the auditing and one of the assurances the AOSS must be given is that the firm selected meet all Department requirements for audits of this type. It is recommended that audits be conducted on a lease year basis.

5.4 Meetings

Two types of meetings are discussed here: those that the AOSS holds with each of the Lessees, and those the OSEAP conducts. The periodic meetings held by the AOSS staff for internal control purposes are discussed in Section 4 above. There are also many meetings that will be held on an ad hoc basis by committees of the OSEAP and by

the AOSS with those groups interested in the prototype program that are not addressed here.

5.4.1 OSEAP Meetings

By charter, the OSEAP meets quarterly and meetings usually extend over several days. These meetings are open to the public (as space will allow) and are scheduled in different locations in Colorado and Utah to provide as much local coverage as possible. Departmental Manual 615 DM 3 describes OSEAP responsibilities and the makeup of the membership. $10,000 are budgeted for panel meetings each year; as of February 1975, the panel has met seven times since its inception in March 1974.

Since the panel was created to advise the AOSS on environmental matters, the AOSS has the responsibility of including on the panel agendas items for discussion. The AOSS coordinates with the Lessees to insure their participation in discussions of these items where necessary. Depending on the nature of the topics raised by the AOSS the presence of appropriate tract coordinators and other AOSS staff specialists may be required.

Official minutes of these meetings must be maintained as an essential part of the prototype program record. The minutes should be kept by the panel secretary; they must be reviewed by the AOSS for technical accuracy prior to panel distribution.

5.4.2 Meetings With The Lessees

The AOSS presently conducts separate meetings each month with the three Lessees. These are held at Lessee facilities to ensure the availability of Lessee specialists as needed during the meetings. The agendas are presently set by the Lessees and attendance is restricted. Each Lessee keeps minutes of the meetings; the tract coordinators should keep informal notes of the meetings in an appropriate record book. All handouts at the meetings should be properly marked and stored with the record book.

These meetings are held to show progress and to discuss future plans. It is recommended that tract coordinators deal immediately with the Lessees on matters of importance rather than waiting for a monthly meeting. The coordinators should use these meetings as a means of probing the Lessees for detail. In this regard, the coordinators should always attempt to have one item on the agenda address some particular facet of the baseline data collection/monitoring program effort.

6.0 MAJOR INTERFACES AND EXTERNAL REVIEWS

In managing the prototype oil shale leasing program, the Area Oil Shale Supervisor (AOSS) must interface with numerous groups, with some of which he shares responsibility for lease monitoring, environmental standards enforcement, and mine safety, as well as overall program coordination. The interfacing between the AOSS and the various groups is accomplished in a variety of ways, such as by meetings, correspondence, requests for information, public hearings, and by news releases. There also are reports submitted by each Lessee, which are reviewed by people external to the AOSS's office at his request as well as certain key documents like Detailed Development Plans which must undergo public hearings before they are approved.

This section of the Management Plan identifies the major interfaces, delineates the appropriate interactions with the parties, and describes the processes for examination of reports and decisions external to the AOSS.

Table 6.1 summarizes the major interfaces and reviews involving the AOSS. The table identifies with whom the interface occurs, what the interaction is, the purpose for the interface and the section in the plan which discusses the interaction in greater detail.

6.1 Major Interfaces

Of the numerous parties involved in the prototype oil shale leasing program, several have been identified as major interfaces. The means for accomplishing these major interfaces are discussed below.

6.1.1 Lessees

One of the more important interfaces the Area Oil Shale Supervisor maintains is with the Lessees. Every Lessee plan for exploratory work and actual development of the tract must be reviewed and approved by the AOSS. Differences of opinion in the Lessees' projects are resolved by interactions between the AOSS and the Lessees.

Currently, a monthly coordination meeting attended by the AOSS, the Bureau of Land Management (BLM), and each Lessee allows for an exchange of ideas, a briefing to update the AOSS on site progress to date, a review of future planned activities, and a discussion of other items of mutual interest. On-tract problems not necessarily pertinent to BLM are avoided; such problems are handled strictly between the AOSS and the Lessee in other meetings.

Although the following practices are usually adhered to, it is recommended that they become formalized and made an integral part of the process by which the AOSS interfaces with each Lessee.

TABLE 1

SUMMARY OF MAJOR INTERFACES AND REVIEWS

INTERFACE	INTERACTION	PURPOSE	TEXT REFERENCE
AOSS/BLM/Lessees	Monthly Coordination Meeting	Discuss current progress	6.1.1 and 6.1.2
AOSS/Lessees	Routine Communications	Discuss status of documents, coordinate tract visits, resolve potential problems	6.1.1
AOSS/BLM	Routine Communications	Discuss tract surface use, environmental protection aspects and reclamation aspects of the program	6.1.2
AOSS/OSEAP	Panel Review (meets at least quarterly)	Discuss proposed tract activities affecting the environmental aspects of the program	6.1.3
AOSS/State of Colorado (Div of Health & State Engineer)	Review Baseline Data Acquired by Colorado Lessees	Examine Well Logs, Air and Water Quality Data to insure compliance with State requirements	6.1.4
AOSS/EPA	Review Baseline Data Acquired by Colorado and Utah Lessees	Examine Environmental Data presented in Quarterly Progress Reports	6.1.5
AOSS/MESA	Routine Communications	Discuss topics of mutual interest	6.1.6
AOSS/WRD (USGS)	Review Data	Examine Well Logs and Water Quality Data	6.1.7
AOSS/Conservation Division (USGS)	Routine Administrative Reporting	Report on general condition of land under lease	6.1.8
AOSS/General Public	Hearings, News Releases, Magazine Articles, talks, OSEAP Meetings, Quarterly Progress Reports	Release of information, fact finding, public relations, inspection of data	6.1.9, 6.2, and 6.3

Because there are usually three coordination meetings a month (one with each Lessee), the meetings should be scheduled to minimize traveling time for the AOSS's staff. Agendas should be jointly arrived at before the meeting by the Lessee and AOSS as well as the appropriate District Manager of the BLM to ensure an orderly meeting, one which does not get sidetracked by minor issues that can be settled later. The agendas should be prepared a week before the scheduled meeting date so that appropriate personnel from each of the participating groups can plan to attend.

The Lessees should send to these meetings their personnel deemed responsible for the topics to be discussed, individuals of authority in the management of their project, and those people, including their consultants, who have a major role in the topics being discussed. From the Area Oil Shale Supervisor's office the personnel who should attend the monthly coordination meetings are the Area Oil Shale Supervisor or his deputy, the appropriate tract coordinator, and the specialists whose areas of expertise are to be specifically discussed. The appropriate District Manager of the BLM and members of his staff concerned with items proposed for discussion should also be in attendance.

Another interaction between the Lessees and the AOSS occurs on a routine basis. When the Lessees (or one of their contractors) desire some information, have a question, or wish to discuss a matter, the AOSS's office responds, usually by phone or, more formally, by letter. This method of coordination between the AOSS and Lessees is critical, since the resolution of day-to-day issues keeps the program on target.

In handling these routine interfaces with the Lessees, it is recommended that the AOSS adopt the following practices:

Oral Communications

A Lessee should first talk with the appropriate tract coordinator concerning an issue relating to the tract. Depending upon the nature of the issue, the coordinator will direct the Lessee (1) to the proper member of the AOSS's staff for further discussion, (2) to submit the matter in writing to the AOSS (which should be done if the issue is an important one), or (3) to take certain actions based on prescribed policies of the AOSS. The tract coordinators must keep a log of their conversations involving important issues concerning their respective tracts and include the outcome of the conversations.

The Lessees should be encouraged to go through the tract coordinators at all times. However, if a matter has already been brought to the attention of a tract coordinator by the Lessee, the Lessee and the staff specialist involved should interact directly. The staff specialist must keep the tract coordinator informed of his talks with the Lessee. Whenever material is prepared by the staff specialist as a result of the conversation(s) with the Lessee, the tract coordinator should review the material before it is transmitted.

Written Communications

All written communications from the Lessees should be addressed to the Area Oil Shale Supervisor. Letters from a Lessee that do not involve policy decisions should be routinely forwarded to a tract coordinator for disposition. The AOSS may wish to read some of the letters but it is not necessary that he review them all. Those letters from the Lessees concerning policy matters must be brought to the attention of the AOSS for disposition by the tract coordinators.

Written communications from the Lessees should be reviewed by the tract coordinator who must decide (1) the appropriate action to take, and/or (2) to which staff specialist(s) the letter should go for action.

All official correspondence from the AOSS's office should be over the signature of the Area Oil Shale Supervisor, although most letters to a Lessee will be drafted by a staff specialist and/or tract coordinator. The tract coordinator should receive copies of all correspondence relevant to his tract.

6.1.2 Bureau of Land Management

Sharing a role in the prototype oil shale leasing program with the Area Oil Shale Supervisor is the BLM. To better serve the needs of the program pursuant to the Secretary's Order Number 2948, the AOSS has been given primary jurisdiction over the leased tracts of land, while the BLM has been given jurisdiction over the off-tract lands including utility and transportation corridors.

After issuance of the lease and until lease termination, the AOSS is the sole representative of the Secretary in all matters relating to the supervision of operations;* but the AOSS consults with the BLM on the adequacy of the surface use, environmental protection, and reclamation aspects of a Lessee's plans for exploration, development, and abandonment before granting approval.**

Further enumeration of the responsibilities of and delegation of authority to the AOSS and the BLM is found in Appendix I-7 which contains a copy of Order Number 2948 from the Office of the Secretary of the Interior.

There are two ways in which the AOSS and the BLM interface: the monthly coordination meeting (see Section 6.1.1) and via routine communications. Because the monthly coordination meeting has been previously discussed, only the routine communications will be examined. Though some of the practices discussed are presently being performed it is recommended that they be formally adopted for all future routine communications between the two organizations.

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*Office of the Secretary, Order Number 2948, Sec. 2, (c)(2)(See Appendix I-7)

** Ibid, Sec. 2 (a)

As with the Lessees, the appropriate tract coordinator should be the person contacted by the BLM. If the tract coordinator feels the matter involves policy, the AOSS or his deputy can be called in. Otherwise the tract coordinator should handle the contact himself or address the matter to a staff specialist. The tract coordinator must be kept informed of the outcome of the staff specialist interaction with the BLM whether it involves a purely verbal exchange or correspondence is involved. The tract coordinator must maintain a tract log of these communications with the BLM.

Written Communications

All written communications should follow the procedures outlined by appropriate Departmental Manual. Letters from the AOSS should be signed by the Area Oil Shale Supervisor and addressed to the appropriate person at the BLM (usually the district manager). The BLM letters should be addressed to the AOSS, although it is not necessary that the AOSS review each one.

6.1.3 Oil Shale Environmental Advisory Panel

The OSEAP performs an advisory role in the enforcement of the provisions of the prototype oil shale leases that deal with the protection of the environment; in particular, the panel focuses on the enforcement of the oil shale lease environmental stipulations, and consults with and reviews decisions of the AOSS and the District Manager of the BLM about environmental matters. The panel performs its advisory role by allowing each panel member an opportunity to make individual comment, by holding subpanel meetings to examine issues in greater detail, and by holding full panel reviews and hearings. Depending on the significance of the decision to be made, the Chairman of the Oil Shale Environmental Advisory Panel should determine by which method the panel should perform its initial review, i.e., individually, by subpanel, or with the full panel. Although the panel is advisory in nature, the panel can take formal exception to a decision made by the AOSS (or BLM) through the channels prescribed in the OSEAP charter. However, the close working relationship between the OSEAP and the AOSS should obviate the need for this procedure to be invoked. By virtue of AOSS attendance at the meetings of the panel as well as frequent informal communications between the OSEAP chairman (and/or executive director) and the AOSS, a smooth working relationship between the two organizations is fostered.

Though the decision on the frequency of meetings and their locations is primarily up to the chairman, the OSEAP should meet at least every other month during the Pre-Development and the Development Phases of the prototype program (Lease years 2-6); the meetings should

continue to be held in a variety of locations in Utah and Colorado to give wide dissemination of topics of regional interest. Meeting agendas should be composed jointly by the Area Oil Shale Supervisor, the appropriate District Managers of the BLM, and the chairman and/or the executive director of the advisory panel. Lessee input to the agenda should be through the AOSS. The agenda should be completed prior to the panel meeting with sufficient time to allow all participants adequate time for preparation.

Although it is suggested that the Oil Shale Environmental Advisory Panel meet at least every other month, it is possible that meetings could be held more or less frequently depending on the progress of the Lessees in their programs, on the urgency of the environmental decisions which must be made by the Area Oil Shale Supervisor, and on problems encountered in the environmental policy aspects of the prototype oil shale leasing program. The decision on where and when the panel should meet, however, is primarily that of the panel chairman.

A formal meeting of the entire OSEAP should (and usually does) include the following participants: the panel members, the AOSS, the District Managers of the BLM who have jurisdiction over the leased land, and personnel from the Lessees' staffs. Although the meetings of the panel are generally open to the public and representatives from the news media usually attend, the public is not necessarily permitted an active role in the panel proceedings.

6.1.4 State of Colorado

The AOSS is routinely interfacing with the Colorado Division of Health and the Colorado State Engineers Office. The Division of Health regularly receives air and water quality information including well water discharge data all of which had been submitted to the AOSS by the Lessees located in Colorado. The State Engineer receives well log data from the AOSS as it is made available by the Lessees from Colorado.

Both agencies can make comment to the AOSS about the adequacy of the information received, though neither is required to do so.

6.1.5 Environmental Protection Agency (EPA)

Because the prototype oil shale leasing program is attempting to determine not only the economic feasibility of oil shale production but the environmental consequences of such a program, the EPA (specifically EPA Region VIII) has an interest in following the program, especially in the areas of air and water quality. Since the oil shale land is undeveloped except as grazing land, the changes brought about to the environment by the oil shale industry are of great concern to the EPA.

Requests from EPA to the AOSS for environmental data should be handled through the proper interagency channels. Likewise, information requested by the AOSS from the EPA should follow applicable communications channels.

The summary report (Part I) of each Lesssee's Quarterly Progress Report is currently sent to the Administrator, EPA Region VIII, by the AOSS for advice and comment. If detailed information and/or raw data is needed by the EPA to examine the Quarterly Progress Report in more detail, Part II of these reports can be made available as the AOSS deems appropriate.

6.1.6 Mining Enforcement and Safety Administration (MESA)

Once the Lessees begin developing the mine operations on the leased tracts, inspectors from the MESA are charged with observing the daily mining operations, reporting violations, and enforcing safety regulations. The AOSS must cooperate with these officials. Furthermore, the Lessees may request variances with certain mine health and safety stipulations which would have to be approved by the MESA.

The interface established should be along the formal lines of inter-agency communication and informally between the AOSS (or his designee) and the MESA mine inspectors as deemed appropriate.

6.1.7 Water Resources Division, United States Geological Survey

The Water Resources Division (WRD) routinely receives copies of well logs and water quality analyses submitted to the AOSS by the Lessees. The WRD are thus given an opportunity to inspect the data relevant to their area of expertise and are free to forward to the AOSS whatever comments in that regard are pertinent.

6.1.8 Conservation Division, United States Geological Survey

As a section of the Conservation Division, the AOSS's office must respond to requests and directives from the Conservation Division including such items as budget preparations, standard reports, special reports or documentation, replies to Congressmen, and policy decisions. The AOSS currently prepares monthly action reports for the Central Region which in turn reach the national headquarters of the Conservation Division. The Conservation Division manual which sets out the contents and formats for required reports is presently being prepared. However, due to the uniqueness of the Area Oil Shale Supervisor's Office, the AOSS may well be in a position to determine the types of reports to be submitted to the Division and to help establish the type of relationship that will exist between the AOSS and his superiors (one such document being contemplated by the AOSS's office is a special survey report on the various aspects of the ongoing environmental baseline data programs).

6.1.9 Quarterly Progress Report Distribution

A summary report (Part I) of the Quarterly Progress Report submitted by each Lessee is disseminated by the AOSS. Individuals belonging to local, state, or federal governmental agencies expressing an interest in the prototype oil shale program are sent the report to review and to comment upon if desired. Distribution lists are organized by the states in which the Lessees are located, i.e., there is presently a Colorado distribution list receiving quarterly summary reports from the Lessees in Colorado and a similar distribution list for Utah.

Copies of the summary reports of the Quarterly Progress Reports should continue to be made available in suitable locations to keep the general public informed about the program. A prime concern should be distribution to the localities directly affected by the program. Copies of the summary reports should at least be made available to the public libraries in Grand Junction, Rifle, Meeker, and Rangely in Colorado and Vernal, Utah. Local offices of the United States Geological Survey and the Bureau of Land Management in the previously mentioned areas could be another outlet for the summary reports. Local Chambers of Commerce as well as city and county government offices should also be on the distribution lists to allow the general public to inspect the summary report.

6.2 External Reviews

6.2.1 Hearings

The Area Oil Shale Supervisor must be concerned about two activities which require public hearings. The Detailed Development Plan (DDP) for each Lessee must have public hearings on the environmental aspects of the plan. Once the AOSS is satisfied with a Lessee's Detailed Development Plan, the portions of the DDP requiring public hearings could be released to the public by making copies available in local public libraries, at local, state and federal government offices located in the program areas, and from the Area Oil Shale Supervisor's office. It is likely that public hearings on the DDPs from the Colorado Lessees will be held in Grand Junction (CO), Meeker (CO), Rangely (CO), and Denver (CO); while the Utah Lessee's DDP should have public hearings in Vernal (UT), Salt Lake City (UT) and Rangely (CO). By law, the public hearings will be held after notices are published in the federal register and in local papers; this process will give the general public at least 30 days to review the environmental aspects of the DDP.

The second case in which public hearings are required is if an Environmental Impact Analysis (E.I.A.) or Statement (E.I.S.) must be made on a site-specific basis. Although it is not absolutely clear that a public hearing is required for an environmental impact analysis, such a public hearing is held to avoid possible litigation problems later. Again the same sites suggested for the DDP hearings would suffice for these public hearings.

6.2.2 Public Relations

The Area Oil Shale Supervisor is obliged to operate his office so that all concerned groups (environmentalists, local residents, Lessees, and governmental agencies) can voice their feelings. This permits him to consider inputs from a variety of sources, to evaluate differences among them, and to insure that the prototype oil shale leasing program is kept in the public view. To accomplish this the AOSS should employ a variety of public relations devices.

For example, the AOSS staff should be encouraged to give talks to local clubs and service organizations to explain the program (many organizations are constantly seeking speakers for their meetings). Opportunities to speak at energy symposiums and other conferences should be sought out to further extend knowledge about and interest in the oil shale program.

Although the OSEAP was not envisioned as a public relations device, the advisory panel meetings do offer the AOSS and panel members an opportunity to inform and educate the public and the private community about the prototype oil shale leasing program. The policy of holding panel meetings in those counties where the oil shale tracts are located allows concerned citizens to learn firsthand about program activities while there is time to influence decisions. Encouraging local residents to attend panel meetings when held in their locality can be accomplished by public service announcements by radio and television as well as news items in local papers.

The publication of a newsletter by the AOSS's office would be a good public relations device; if this would involve a review by the Geological Survey before release, perhaps the newsletter could be an informal news release that would still satisfy the same needs in a much simpler manner. The AOSS should also solicit requests for articles by trade and scientific magazines such as Shale Country Magazine, Happy Motoring News, and Police Chief.

The holding of public hearings which allow citizens a chance to speak also should be encouraged whenever major policy decisions affecting a community or region must be made. Inputs from such hearings could allow the Area Oil Shale Supervisor to render more prudent decisions or to at least inform the public of a decision that has been made. Of course, criteria for determining whether or not a public hearing should be held is vested with the Area Oil Shale Supervisor. Realizing that public hearings can be both a benefit and a detriment, the AOSS would have to be very selective about when and how to conduct such hearings.

The dissemination of the summary report (Part I) of the Quarterly Progress Report for inspection by the public (as discussed in Section 6.1.9) is another good public relations technique.

Because the Area Oil Shale Supervisor is managing the prototype oil shale leasing program for the benefit of the government as well as the public, he and his staff are often caught between opposing interests. It is his job to see that the program operates as smoothly as possible, but in a manner consistent with the concept of a prototype program. Since he must avoid where possible isolating or antagonizing any interest group, the Area Oil Shale Supervisor should adopt those public relations methods that enable him to proceed with minimum delay, are consistent with governmental environmental policies, and are in accord with budgetary constraints.

APPENDIX I-1

BACKGROUND INFORMATION ON THE MITRE CORPORATION

BACKGROUND INFORMATION ON THE MITRE CORPORATION

The MITRE Corporation is an independent nonprofit corporation founded in 1958 at the request of the United States Air Force. The Charter of the Corporation states: "The nature of the business or purposes to be conducted or promoted by the Corporation shall be exclusively scientific, namely: to enhance the security of the United States of America or otherwise to further the public interest, by engaging in, assisting and contributing to the support of scientific activities and projects, and by performing, engaging in and procuring research, development, engineering and advisory services." MITRE's principal sponsor is the United States Air Force; however, shortly after its inception, the Corporation expanded its services to include support of other DoD and non-military programs notably those of the Defense Communications Agency and the Federal Aviation Agency. Since then, MITRE has extended its support to other government departments and today is serving numerous civil as well as military agencies, state and municipal governments, and other organizations working in the public interest.

MITRE has two major facilities--one located in Bedford, Massachusetts, and the other located in McLean, Virginia--and employs 2300 employees. As a nonprofit organization working solely in the public interest, MITRE is neither a part of industry nor a part of government. Operating between these two spheres, free of the pressure to show a profit, it can focus its resources on solutions to problems which are either too complex or too ill-defined to be profitable propositions for industry or too pervasive for government laboratories. To our clients, representing both civilian and military agencies, we offer integrity and objectivity as well as technical competence.

The main thread tying together MITRE's diverse projects is the systems approach. Applicable to a wide range of problems, this means of organizing for and working toward problem solutions involves consideration of all relevant factors and their interrelationships, making use of a full range of integrated skills drawn from among numerous technical and management disciplines found at MITRE.

The Energy, Resources and Environment Division of The MITRE Corporation has had extensive experience in providing support to federal agencies such as the Federal Energy Administration, Environmental Protection Agency, National Science Foundation, etc. in developing energy policies. The MITRE Corporation is presently under contract to the United States Geological Survey to provide technical assistance to the Office of the Area Oil Shale Supervisor in developing an Oil Shale Lease Management Plan.

The MITRE Corporation is acting ONLY IN AN ADVISORY CAPACITY and has NO absolute responsibility for decisions regarding development or management of oil shale leases. The final decision as to any recommendation made by The MITRE Corporation rests with the Area Oil Shale Supervisor.

The MITRE Corporation will provide inputs to the Area Oil Shale Supervisor in a management plan covering:

1) a goal for coordination and presentation of environmental base line data and reports,

2) an outline for a detailed development plan to provide guidance to the Area Oil Shale Supervisor and lessees,

3) a data base management system for collection, retrieval, storage and dissemination.

4) an outline and schedule of "progress reports,"

5) development, monitoring and reporting of standard criteria, and constraints imposed on the lessee,

6) a major milestone schedule.

In order to carry out responsibilities to the Area Oil Shale Supervisor in a manner which is both beneficial to the oil shale lessee and to the United States Government, it is necessary to obtain as much information as possible regarding the development of the oil shale leases from the viewpoint of the lessees and also to obtain as much information as possible regarding environmental problems and other problems as viewed by groups other than the lessees. Therefore, MITRE is requesting information inputs from the lessees and all other interested parties pertaining to the development of this Oil Shale Lease Management Plan.

All information supplied to MITRE will be considered proprietary and not disclosed to other parties unless permission is granted by the party supplying the information. The overall goal of the MITRE program is to supply the Office of the Area Oio Shale Supervisor with an objective, overall management plan which will expedite the development of the area oil shale leases in a manner consistent with environmental constraints and economic considerations.

APPENDIX I-2

REGULATIONS, LAWS, LICENSES AND PERMITS

REGULATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSIN		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals		
1. AIR POLLUTION													
1.1 GENERAL													
- CLEAN AIR ACT (42 USC 1857 ET SEQ)	EPA, STATES	X	X	X			X	X	X				
- AIR POLLUTION CONTROL ACT OF 1970	COLORADO APC COMMISSION	X	X					X	X				
_ UCA 1953, 26-24	UTAH AIR CONSERVATION COMMITTE, AIR CONSERVATION COUNCIL	X	X					X					
- PROPOSED AIR CONSERVATION REGS	UTAH (Dated 10/29/74)	X						X					
1.2 AMBIENT													
- NATIONAL AMBIENT AIR QUALITY STANDARDS	EPA, COLORADO, UTAH						X	X					
- AIR QUALITY REGS AND AMBIENT AIR QUALITY STANDARDS	COLORADO APC COMMISSION				X			X					X
- AIR POLLUTION CONTROL REGS	COLORADO APC DIVISION		X					X					X

LATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits	
- AIR CONSERVATION REGS (23 JAN 72)	UTAH DIVISION OF HEALTH							X					
- PROPOSED AIR CONSERVATION (REGS)(29 OCT 74)	UTAH							X					
1.3 EMISSION CONTROL													
- NEW STATIONARY SOURCES (FR 8 MAR 74)	EPA, COLORADO, UTAH							X					
- INDIRECT SOURCE REVIEW(FR 8 MAR 74)	COLORADO							X					
- AIR QUALITY REGS AND AMBIENT AIR QUALITY STANDARDS	COLORADO APC COMMISSION							X					X
- AIR POLLUTION CONTROL ACT OF 1970	COLORADO APC DIVISION	X	X						X	X			
- HYDROCARBUM VAPORS REGULATION	COLORADO APC DIVISION						X	X					
- UCA 1953, 26-24	UTAH AIR CONSERVATION COMMITTEE, AIR CONSERVATION COUNCIL	X	X					X					

TABLE 5.1 SUMMARY INFORMATION: PLANS, REPORTS, AND INSPECTIONS

	TITLE	AUTHORITY	ACTION OFFICE	WHEN REQUIRED	TEXT REFERENCE
1.	Plans and Reports				
	Exploration Plan	Lease, Sect. 10(d)	Each Lessee	Before Any Exploration Begins	5.2.1
	Detailed Development Plan (DDP)	Lease, Sect. 10(d)	Each Lessee	Before Any Development Begins	5.2.2
	Quarterly Progress Report	AOSS	Each Lessee	Mar, Jun, Sep, Dec, Each Year	5.2.3
	Annual Progress Report	Lease, Sect. 10(c)	Each Lessee	Lease Anniversary Date	5.2.4
	Two-Year Baseline Data Report	Lease E.S.,Sect.1(c)(4)	Each Lessee	Prior to Final DDP Approval	5.2.5
	Expense Report	Lease Sect. 16(a)	Each Lessee	Recommend Mar, Jun, Sep, Dec, Each Year	5.2.6
	Annual Report To The Secretary	DOI 615 DM3	OSEAP	Recommend December Each Year	5.2.7
	Information Report	30 CFR 231.3	AOSS	Recommend Jun, Dec, Each Year	5.2.8
	Production Report	Lease, Sect. 16(a)	Each Lessee	Mar, Jun, Sep, Dec, Each Year	5.2.9
	Report of Cessation Or Abandonment Of Operations	43 CFR 23.10	Each Lessee	30 Days Prior To Cessation Or Abandonment	
2.	Operations Inspection	30 CFR 231.3	AOSS	Recommend Twice monthly	5.3.1
	Air/Water Management Inspection	30 CFR 231.3	AOSS	Recommend Twice monthly	5.3.2
	Minerals Production Inspection	30 CFR 231.3	AOSS	Recommend Monthly Records Check	5.3.3
	Rentals/Royalties/Bonding Inspection	30 CFR 231.10	AOSS	Monthly for Royalties, Yearly for Rentals, Bonding as Required	5.3.4
	Grading and Backfilling Inspection	43 CFR 23.10	AOSS	As Activities Are Completed By Lessee	5.3.5
	Planting Inspection	43 CFR 23.10	AOSS	After Each Full Growing Season	5.3.6
	Surface Protection and Reclamations Inspection	30 CFR 231.3	AOSS	Upon reeeipt of Lessee's Notice To Cease or Abandon	5.3.7
	Audits of Aecounts and Books	30 CFR 231.62	AOSS	Lease Anniversary Date	5.3.8

NOTE:

1. AOSS = Area Oil Shale Supervisor
2. OSEAP = Oil Shale Environmental Advisory Panel
3. Anniversary Dates For Colorado Leases Are In March, For Utah Leases Are In June

TABLE 5.2

PORTIONS OF EXPLORATION PLANS REMAINING

TO BE APPROVED, 31 MARCH 1975

Tract C-a	Tract C-b	Tract U-a, U-b
Visibility	Visibility	Visibility
Noise	Noise	Noise
Water Conrol and Corridor Planning* - Reservoir - Corridor Planning	Programs - Environmental Baseline Monitoring Program Scenic Resources Initial Fish and Wildlife Management Plan** Erosion Control and Surface Rehabilitation Plan**	Environmental Baseline Data Collection - Initial Fish and Wildlife Management Plan - Aerial Photography and Topographic Mapping Site Facilities and Operations - Site Preparation and Construction - Access Roads - Corridor Planning - Off-site Facilities - Waste Management Program - Safety, Fire Protection and Other Control Measures - Construction Details and Surface Rehabilitation Socioeconomic Baseline Data Collection Schedule of Manpower Requirements

* This item subject to BLM approval.

** These items are to be included in the Tract C-b DDP.

Tract C-a	Tract C-b	Tract W-a, W-b
Visibility	Visibility	Visibility
Noise	Noise	Noise
Water Control and Corridor Planning*	Topography	Geological Baseline Data Collection
- Reservoir	- Environmental Baseline Monitoring Program	- Initial Fish and Wildlife Management Plan
- Corridor Planning	Scenic Resources	Topographic Mapping
	Initial Fish and Wildlife Management Plan**	Site Facilities and Operations
	Erosion Control and Surface Rehabilitation Plan**	- Site Preparation and Construction - Access Roads - Corridor Planning - Off-site Facilities - Waste Management Program - Safety, Fire Protection and Other Control Measures - Constructing Details and Surface Rehabilitation
		Geotechnical Baseline Data Collection
		Schedule of Manpower Requirements

* This item subject to BIA approval.

** These items are to be included in the Tract C-b EMP.

ATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits	
- AIR CONSERVATION REGS (23 JAN 1972)													
- PROPOSED AIR CONSERVATION REGS	UTAH (DATED 10/29/74)							X					
CONSTRUCTION													
2.1 BUILDINGS													
- CONSTRUCTION PERMIT	COLORADO APC DIVISION		X					X				X	
- BUILDING REGS	RIO BLANCO COUNTY COMMISSION							X		X		X	
2.2 PUBLIC UTILITIES													
- TEL & TEL ROW	BLM											X	
- POWER TRANSMISSION ROW	BLM, PUBLIC SERVICE CO											X	
- RAILROAD ROW	ICC, RAILROAD CO.											X	

GULATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits	
2.3 PIPELINE FACILITIES													
- PRODUCT PIPELINE ROW	BLM, STATE DISTRICT ENGINEER		X									X	
- WATER PIPELINE ROW	BLM, COLORADO D.E.											X	
2.4 ROADS													
- RIVER CROSSINGS	ARMY CORPS OF ENGINEERS		X									X	
- ACCESS ROADS	BLM		X									X	
- VEHICULAR RESTRICTIONS	RIO BLANCO COUNTY CHAP. 900							X		X		X	
3. MINING													
3.1 GENERAL													
- 30 CFR 231	USGS (DOI)		X					X			X		
- 43 CFR 23	BLM, USGS (DOI)	X	X								X	X	

REGULATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING	
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits
3.2 BORE HOLES												
- 30 CFR 231	USGS (DOI)			X				X				
3.3 DRILL PADS												
- OFF TRACT	BLM/LANDOWNER											X
- ON TRACT	USGS											X
3.4 EXPLORATION, RECLAMATION												
- 43 CFR 23	BLM, USGS (DOI)	X	X								X	X
3.5 METHODS, SAFETY												
- 30 CFR 231	USGS (DOI)		X					X			X	
3.6 MILL TAILINGS												
- GUIDELINES (13 MAR 68)	COLORADO WPC COMMISSION						X					
- SOLID WASTE DISPOSAL REGS (14 AUG 74)	UTAH HEALTH DIVISION							X			X	

LATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSIN		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals		
3.7 MINE DRAINAGE													
- GUIDELINES	COLORADO WPC COMMISSION				X	X	X						
3.8 OPEN MINING													
- HB #1033	COLORADO BOARD OF RECLAMATION	X						X	X				
3.9 SURFACE STABILIZATION													
- CRS 1963, 92-32-5	COLORADO BUREAU OF MINES					X	X		X				
4. OIL POLLUTION													
4.1 GENERAL													
- 40 CFR 109,112	EPA		X				X						
- 40 CFR 114	EPA, COAST GUARD, DOT	X							X				

REGULATION	ACTION AGENCY	REGULATION RELEVANCE: ACTIONS			PERFORMANCE				LEGALITY		LICENSING	
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits
4.2 SPILLS												
- CONTINGENCY PLAN	CC OR EPA (IN FLUX)		X									
- UCA 1953, 17-14-95	UTAH BUR. OF ENVIR. HEALTH	X		X						X		
- HAZARDOUS DIRECTORY	EPA, UTAH DIV. OF HEALTH	x										
SOLID WASTE												
5.1 GNEERAL												
- DISPOSAL .REGS (14 AUG 74)	UTAH DIVISION OF HEALTH							X				X
(NOTE INERT CONSTRUCTION MATERIAL EXCLUSION)												
- DISPOSAL SITES AND FACILITIES LAW (1 JUL 71)	COLORADO DEPT. OF HEALTH				X			X	X			
- SOLID WASTE REGS (1 APR 72)	COLORADO BOARD OF HEALTH				X			X	X			

LATION	ACTION AGENCY	REGULATION RELEVANCE										
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING	
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	
. WATER POLLUTION												
6.1 GENERAL	EPA											
- FEDERAL WATER POLLUTION CONTROL ACT (33 USC 1151)	EPA	X					X					X
- 40 CFR 124	EPA											X
- 40 CFR 136 ANALYSIS OF POLLUTANTS	EPA				X			X				
- PL 92-500	EPA	X					X				X	
- WATER QUALITY CONTROL ACT (1 JUL 73)	COLORADO WQC COMMISSION		X					X	X	X		
- CRS 1963, 66-28-8	COLORADO WQC COMMISSION				X			X				
- 1974 WQ STANDARDS	COLORADO WQC COMMISSION						X	X				
- 1974 WQ BASIN CLASSIFICATIONS	COLORADO WQC COMMISSION							X				
- PROPOSED WQ REGS (15 OCT 74)	COLORADO WPC COMMISSION			X						X		
- UCA 1953, 73-14 (POLLUTION CONTROL ACT)	UTAH WPC BOARD	X										

CATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals		
- UCA 1953, 17-14-9,5	UTAH BUR. OF ENVIR. HEALTH	X		X						X			
6.2 DISCHARGES													
- CRS 1963, 66-28-5-0	COLORADO HEALTH DEPT.												X
- CRS 1963, 67-28-8	COLORADO WPC COMMISSION							X					
- REGULATIONS (31 JAN 75)	COLORADO WQC COMMISSION			X									X
- CRS 1963, 66-28-8	COLORADO WQC COMMISSION							X					
- UCA 1953, 73-14	UTAH WPC BOARD												
6.3 DISPOSAL, COMMERCIAL													
- WASTE DISPOSAL REGS (14 AUG 74)	UTAH STATE BD. OF HEALTH	X						X					
.4 DISPOSAL, INDIVIDUAL (DOMESTIC)													
- REGULATIONS	COLORADO WQC COMMISSION LOCAL BDS. OF HEALTH	X						X					

R[illegible]TION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING	
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits
- WASTE DISPOSAL REGULATIONS	UTAH LOCAL HEALTH AUTHORITY	X						X				X
- REGS, CHAPTER 800	RIO BLANCO BD. OF HEALTH					X	X	X				X
6.5 DISPOSAL, SUBSURFACE											X	X
- CRS 1963, 66-28-8(5)	COLORADO WPC COMMISSION											X
- NEW RULES (1 MAY 74)	COLORADO PUBLIC HEALTH DEPT.	X	X									
.6 RESERVOIR/SPILLWAY												
- SITE APPROVALS	STATE ENGINEER		X			X						X
.7 SALINITY CONTROL												
- 40 CFR 120 (COLORADO RIVER SALINITY CONTROL)	EPA, UTAH, COLORADO ET AL	X	X					X				

REGULATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits	
6.8 WASTEWATER TREATMENT													
- PRIMER	EPA						X						
- 40 CFT 133 (THRESHOLD VALUES)	EPA				X			X					
- CRITERIA FOR REVIEW (JUN 73)	COLORADO DEPT. OF HEALTH		X			X		X					
- WASTE DISPOSAL REGS (14 AUG 74)	UTAH DIV. OF HEALTH					X		X			X		
- STANDARDS FOR THE DISCHARGE OF WASTES (15 JAN 73)	COLORADO WPC COMMISSION												
6.9 WELLS													
- NEW RULES (INJECTION)	COLORADO PUBLIC HEALTH DEPT.	X	X									X	
- WATER WELLS	STATE ENGINEERS, BLM USGS											X	
MISCELLANEOUS													
7.1 EXPLOSIVES													

REGULATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING	
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	Permits
- MAGAZINE/EXPLOSIVES	COLORADO DIV. OF MINES	X	X									X
- TRANSPORTATION	IRS (FOR INTERSTATE COMMERCE)											X
7.2 FISH & WILDLIFE - EFFECTS OF FED. PERMITS ON	FED. BUR. OF SPORT FISHERIES & WILDLIFE, STATE	X		X								
7.3 OPERATIONS - PERMIT TO OPERATE	COLORADO APC DIVISION											X
- PRE-OPERATIONS APPROVALS	COUNTY COMMISSIONERS										X	
- BUILDING USE PERMIT	COUNTY COMMISSIONERS											X
7.4 TOWERS - METEOROLOGICAL STATION	FAA (ADVISORY TO)		X								X	

LATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSIN	
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals	
7.5 RADIOLOGY												
- INSTRUMENTATION (NEUTRON DEVICES)												X
7.6 ARCHAEOLOGY												
- SITE SURVEY	DOI, BLM	X		X								X
7.7 HOUSING												
- TRAILERS	BLM, USGS, COUNTY COMMIS.		X							X	X	
- TRAILER PARK	BLM, USGS, COUNTY COMMIS.		X							X	X	
7.8 COMMUNICATIONS												
- MOBILE RADIOS												
- ZONING												
- MOBILE HOMES	COUNTY COMMISSIONERS					X		X		X		X
- SUBDIVISIONS	COUNTY COMMISSIONERS	X				X		X				X

LATION	ACTION AGENCY	REGULATION RELEVANCE											
		ACTIONS			PERFORMANCE				LEGALITY		LICENSING		
		Agency Interfaces	Plans/Programs	Reports/Records	Analysis	Design	Guidelines	Standards	Enforcement	Penalties	Approvals		
7.10 DRINKING WATER													
- SAFE DRINKING WATER ACT (21 JAN 74)	EPA	X							X	X			X
- LAWS AND REGS APPLYING TO POTABLE DRINKING WATER SUPPLY SYSTEMS (JAN 71)	COLORADO DEPT. OF HEALTH				X			X	X				
- CRITERIA FOR STORAGE	COLORADO DEPT. OF HEALTH						X						

APPENDIX I-3

OIL SHALE LEASE AND OIL SHALE LEASE ENVIRONMENTAL STIPULATIONS OUTLINE

U.S. Department of the Interior

Bureau of Land Management

OIL SHALE LEASE

Section 1. Definitions

(a) Oil Shale

(b) Leased Lands

(c) Leased Deposits

(d) Anniversary Date

(e) Lease Year

(f) Ton

(g) Mining Supervisor

(h) Commercial Quantities

Section 2. Grant to Lessee

(Exclusive right and privilege to prospect for, mine, etc.)

Section 3. Lessor's Reserved Interest in the Leased Lands

(a) Right to lease . . .

(b) (Other rights, i.e., easements, etc.)

(c) Right to conduct . . . investigations . . .

Section 4. Lease Term

Section 5. Bonus

Section 6. Rentals

Section 7. Royalties

(a) (Payments to Lessor)

(1) (Computation)

(i) (Extracted by mining methods)

(A) (oil content)

(B) (yearly averaging by Secretary)

(C) (determining shale oil content)

(ii) (Extracted in Situ)

(A) (rate per ton)

(I) (calorimetric tests)

(II) (heating value)

(III) (30 gallons per ton)

(B) (Averaging - see (a)(1)(i)(B) above)

(C) (Quantities - see (a)(1)(i)(C) above)

(2) (Royalties due on other minerals)

(b) (Lessee to keep books on weight or quantitity and quality of all oil shale produced)

(c) (Payments for royalties - due in month following when processed or sold)

(d) (Extraordinary costs offsetting royalties in (a) above)

(e)(1) (Royalties for ≥6th year)

(2) (Credits for expenditures during 6-10th years)

(f) (Relief from payment of royalties if production begins before 8th year)

Section 8. Payments

(Bonuses to State Office of the Bureau; rentals also until lease enters producing status or minimum royalty is required - then rentals and royalties to Mining Supervisor.)

Section 9. Bond

(a) ($20k lease compliance bond)

(b)(1) (After approval of detailed development plan, another compliance bond required)

(2) (During first three lease years after approval of detailed development plan bond shall be at least $20k.)

(i) ($2,000 per acre for shale disposal and mining sites)

(ii) ($500 per acre for all other land.)

(c) ($20k bond required prior to approval of plan for exploratory work, more per decision of Mining Supervisor)

Section 10. Development Plan and Diligence Requirements

(a) (File detailed development plan with Mining Supervisor by 1 April 1977)

(1) (Schedules)

(2) (Detailed description of procedures re: environmental criteria and controls)

(b) (Changes in development plan require Mining Supervisor's written approval)

(c) (Annual progress reports filed with Mining Supervisor)

(d) (Mining Supervisor to approve exploratory work plan covering work prior to approval of development plan)

Section 11. Protection of the Environment; Additional Stipulations

(a) (Compliance with all applicable federal, state and local regulations)

(b) (Damage to the environment)

(c) (Environmental stipulation and breach thereof)

Section 12. Operations on the Leased Lands; Water Rights

(a) (Obligations of lessee)

(1) (Prevent injury to life, health or property)

(2) (Hazards to public health and safety)

(3) (Wasting resources)

(b) (Provisions of CFRs)

(c) (Lessee to take reasonable steps to prevent damage)

(1) (Forage and timber growth)

(2) (Crops)

(3) (Improvements)

(d) (Water rights developed by lessee become property of lessor)

Section 13. Development by In-Situ Methods

(Restrictions on lot line setbacks. Mining Supervisor to approve exceptions)

Section 14. Nuclear Fracturing

(Secretary must approve)

Section 15. Inspection and Investigation

(Lessee to permit DOI representative to . . .)

(a) (Inspect operations and records)

(b) (Make copies and extracts from records)

Section 16. Reports, Maps, Etc.

(a) (Lessor may prescribe quarterly reports due from Lessee on investment and operating costs under lease)

(b) (Lessee to furnish other documentation per CFRs)

Section 17. Notice

(In writing or orally, but confirmed in writing, to Mining Supervisor unless otherwise stated)

Section 18. Employment Practices

(Wages, freedom of purchase, employment)

Section 19. Equal Opportunity Clause; Certification of Non-Segregated Facilities

(a) Equal Opportunity Clause

(1) (No discrimination)

(2) (Employment solicitations)

(3) (Worker representatives interface)

(4) (Compliance with Executive Orders and Department of Labor regulations)

(5) (Information and reports to be filed)

(6) (What happens in event of non-compliance)

(7) (Inclusion of (1) to (7) in contracts, subcontracts, P.O.'s unless Secretary of Labor exempts)

(b) Certification of Non-Segregated Facilities

(Lessee certifies and agrees)

Section 20. Taxes

(Lessee to pay when due)

Section 21. Monopoly and Fair Prices

(Lessor has authority to promulgate and enforce appropriate orders and regulations)

Section 22. Suspension of Operations or Production

(When to occur, authority of Mining Supervisor)

Section 23. Readjustment of Terms and Conditions

(Effective on 20 year anniversary dates)

Section 24. Assignment

(Allowed per CFR)

(a) (Unless assignee not qualified)

(b) (Cannot make bond)

(c) (Amount assigned or retained too small to work)

Section 25. Overriding Royalties

(Lessee limited to assigning 25 percent)

Section 26. Heirs and Successors in Interest

(Obligations of Lessee are binding)

Section 27. Unlawful Interest

(Restrictions on who can derive benefit from lease)

Section 28. Relinquishment of Lease

(a) (Subject to Lessor's approval)

(b) (Manner of filing intent to relinquish)

(1) (Payments due)

(2) (Obligated to preserve improvements)

(3) (Provide for reclamation)

(4) (Comply with other requirements of lease)

Section 29. Remedies in Case of Default

(a) (Lessee to suspend operations)

(b) (Or, initiate judicial proceedings)

Section 30. Effect of Waiver

(Extends only to particular breach waived)

Section 31. Delivery of Premises in Case of Forfeiture

(Property plus improvements to Lessor)

Section 32. Disposition of Property upon Termination of Lease

(a) (Rights of Lessor to purchase certain property)

(b) (Rights of Lessee to remove certain property)

(c) (Lessee property subject to removal by Lessor)

Section 33. Protection of Proprietary Information

(a) (Restrictions on Lessor)

(1) (Need to know)

(2) (Mining Supervisor to authorize reproducing)

(3) (Mining Supervisor to determine proprietary nature)

(b) (In the event lease is terminated and Lessor elects per Section 32, Lessor has right to use technical processes)

(1) (Lessor must replace Lessee as party to contract)

(2) (Lessor to pay Lessee fair market value)

Section 34. Lessee's Liability to the Lessor

(a) (For damages arising from activities)

(b) (Indemnify U.S. from claims)

(c) (When damages are caused by third parties, local rules of subrogation apply)

Section 35. Appeals

(a) (Lessee can appeal decision by the Bureau)

(b) (Appeal of decision by Geological Survey)

(c) (Any action of any official of the Department)

Section 36. Interpretation of This Lease

(a) (Paragraph headings)

(b) (Genders and forms of words)

Signed by State Director

March 18, 1974

Witnessed By: Atlantic Richfield, Ashland Oil, Shell Oil and The Oil Shale Corporation

OIL SHALE LEASE ENVIRONMENTAL STIPULATIONS

SECTION 1. GENERAL

(A) Applicability of Stipulations

(Imposed upon Lessee's agents, employees, contractor, subcontractors.)

(B) Changes in Conditions

[Stipulations] may be revised or amended by mutual consent of M.S., Bureau District Manager and Lessee to adjust to changed conditions or correct an oversight. Lessor may amend [unilaterally to be] consistent with any new Federal or State [environmental] statutes and regulations. . . . (Above three parties to meet at least once per year to review technological advances. Pollution control devices must be flexible enough to comply with changing pollution control laws.)

(C) Collection of Environmental Data and Monitoring Program

(1) Lessee shall compile data to determine the conditions existing prior to any development operations and . . . conduct a monitoring program before, during and subsequent to development operations. The program to provide a record of changes from conditions prior to development operations, as established by the . . . baseline data, a continuing check . . . on the lease and all applicable . . . environmental protection and pollution control requirements, timely notice of detrimental effects . . ., and a factual basis for revision or amendment of these Stipulations . . .

The baseline data shall be collected for a period of at least two consecutive full years.

(2) After the collection of the required baseline data for at least two years, the Lessee shall not be required to conduct a monitoring program on the Leased Lands until (six months prior to start of development operations). (M.S. may terminate requirement for monitoring before or after the termination of development operations.)

(3) (The environmental monitoring program is an integral part of the detailed development plan per Section 10. In the plan it provides the M.S. with a complete compilation of baseline data and monitoring program data for any period subsequent to that compilation.)

(4) (As part of required annual progress reports on development program, Lessee to submit to M.S. a report of the baseline data collected and a report of the monitoring programs. Reports to commence within one year of approval of detailed mining (sic) plan. Reports to be subject to public review.)

(D) Emergency Decisions

(M.S. decisions or approvals to be in writing. May be orally issued in emergency, but written confirmation required.)

(E) Environmental Briefing

(M.S. to identify Federal and State employees to brief personnel (?) on environmental and other pertinent matters. Lessee to make arrangements.)

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
(c) (2)(a)	SURFACE WATER	INSTALLATION OF GAUGING STATIONS ON MAJOR DRAINAGES	NA	ONE UPSTREAM, ONE DOWNSTREAM PER DRAINAGE
		STREAMFLOW RECORDS		EVERY GAUGING STATION
		WATER TEMPERATURES		EVERY GAUGING STATION
		PRECIPITATION RECORDS		EVERY GAUGING STATION
		SEDIMENT RECORDS		EVERY GAUGING STATION
		CHEMICAL CONSTITUENTS		EVERY GAUGING STATION
1(c) (2)(b)	GROUND WATER	DRILL TEST WELL	NA	AT EACH PROPOSED OR ACTUAL MINE SITE
		INSTALL OBSERVATION WELLS	NA	IN EACH WATER-BEARING ZONE DEFINED BY TEST WELL
		COLLECT SAMPLES OF DRILL CUTTINGS PER M.S.		FOR EACH WELL
		MAKE BOREHOLE GEOPHYSICAL LOGS PER M.S.		FOR EACH WELL
		ISOLATE WATER-BEARING ZONES		PENETRATED BY TEST WELLS
		PUMP WATER-BEARING ZONES FOR PERIOD DEFINED BY M.S.		(SAME)
		DURING PUMP TESTS, RECORD		
		- WATER-LEVEL FLUCTUATIONS		IN EACH OF THE OBSERVATION WELLS
		- STEADY CONTINUOUS DISCHARGE MEASUREMENTS		FROM EACH TEST WELL
		- WATER LEVELS AND TEMPERATURES PER M.S. SCHEDULE		EACH TEST WELL AND EACH OBSERVATION WELL
		DURING INITIAL PUMP TEST DETERMINE WATER QUALITY BY ANALYZING WATER SAMPLES FOR		EACH WELL
		- ORGANIC/INORGANIC CHEMICAL CONSTITUENTS - TRACE CONSTITUENTS SUBJECT TO DRINKING WATER STANDARDS AND WATER POLLUTION CONTROL REGULATIONS - ADDITIONAL CONSTITUENTS SPECIFIED BY M.S.		
		COMPLETE ONE OBSERVATION WELL UPGRADIENT, TWO DOWNGRADIENT, DEPTHS AND LOCATIONS TO BE SPECIFIED BY M.S.		EACH SPENT SHALE DISPOSAL SITE

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
1(c) (2) (b)	GROUND WATER	ADDITIONAL OBSERVATION WELLS TO MONITOR WATER QUALITY OF AN AQUIFER FOR EACH OBSERVATION WELL RECORD/ANALYZE - WATER LEVELS - WATER TEMPERATURES - ORGANIC/INORGANIC CHEMICAL CONSTITUENTS - TRACE CONSTITUENTS (SEE 8 ABOVE) - ADDITIONAL CONSTITUENTS SPECIFIED BY M.S.		(SAME)
1(c) (2)(c)	AIR QUALITY	INSTALLATION OF MONITORING STATIONS		FOUR LOCATIONS, ONE AT MAX CONCENTRATION OR AS CLOSE AS FEASIBLE
		STATIONS TO MONITOR FOR - SULPHUR DIOXIDE - HYDROGEN SULPHIDE - SUSPENDED PARTICULATES - HYDROCARBONS (PER M.S.) - OXIDES OF NITROGEN (PER M.S.) - OTHER POLLUTANTS (PER M.S.)		EACH MONITORING STATION
		ESTABLISH METEOROLOGICAL STATIONS		REASONABLE PROXIMITY TO EACH PROPOSED PLANT SITE
		STATIONS TO MONITOR AT GROUND LEVEL, 30 FEET, AND AT LEAST 100 FEET - WIND DIRECTION - WIND SPEED - HUMIDITY		AT EACH METEOROLOGICAL STATION
		MONITOR AT EACH STATION AT 30 FEET AND AT LEAST 100 FEET - TEMPERATURE		"
1(c) (2)(d)	FLORA AND FAUNA	DETERMINE - DISTRIBUTION OF FLORA - DENSITY OF FLORA - CONDITION OF FLORA - SPECIES OF FAUNA - DISTRIBUTION OF FAUNA - ABUNDANCE OF FAUNA		ON LEASED LAND, WITHIN ONE MILE OF LEASED LAND, DISPOSAL SITES, AND AQUATIC HABITATS AS SPECIFIED BY M.S.
		SUBMIT REPORTS ON FLORA AND FAUNA CHANGES		"
		STUDY ECOLOGICAL RELATIONSHIPS (INCLUDING MIGRATORY PATTERNS) OF - BIRDS - MAMMALS - FISH - PLANTS AND ANIMALS		"
(k)		COMPILE AN INVENTORY OF NATURAL SURFACE WATER FEATURE, SUCH AS - SPRINGS - SEEPS		"

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
2(C)	EXISTING AND PLANNED ROADS AND TRAILS	LESSEE TO USE EXISTING ROADS AND TRAILS WHERE FEASIBLE		ON LEASED LAND
		LOCATION, CONSTRUCTION, MAINTENANCE AND CLOSING OF ROADS AND TRAILS	SPECIFICATIONS OF B.L.M. UNLESS M.S. DIRECTS OTHERWISE	ON LEASED LAND
		DRAINAGE STRUCTURES TO BE LOCATED, CONSTRUCTED AND MAINTAINED	"	"
2(D)	WATERBARS AND BREAKS	DIVERSION OF RUNOFF FROM ROADS AND UPHILL SLOPES (WATERBARS, WATERBREAKS, OR CULVERTS).	SPECIFICATIONS OF B.L.M.	"
2(E)	PIPELINE CONSTRUCTION STANDARDS	DESIGN AND CONSTRUCTION OF OIL PIPELINES REF. 49 CFR 192, 195	LATEST D.O.T. STANDARDS PLUS REF.	ON LEASED LAND
2(F)	PIPELINE SAFETY STANDARDS	SAFETY STANDARDS AND REPORTING REQUIREMENTS REF. 49 CFR 110, 192, 195	REF.	ON LEASED LAND
2(G)	SHUT-OFF VALVES	LESSEE TO INSTALL AUTOMATIC SHUT-OFF AT EACH PUMPING OR COMPRESSOR STATION		ON LEASED LAND
		ADDITIONAL VALVE INSTALLATIONS IN VIEW OF - TERRAIN AND DRAINAGE SYSTEMS TRAVERSED - POPULATION CENTERS - WILDLIFE AND FISHERY HABITAT - PUBLIC WATER SUPPLIES AND SIGNIFICANT WATER BODIES - HAZARDOUS GEOLOGIC AREAS - SCENIC VALUES	PER DIRECTION OF M.S.	ON LEASED LAND AND WHEREVER PIPELINE CONSTRUCTED
2(H)	PIPELINE CORROSION	LESSEE TO SUBMIT DETAILED PLANS FOR CORROSION DETECTION	GOOD ENGINEERING PRACTICE	ON LEASED LAND
		PLANS TO INCLUDE - PIPE MATERIAL AND WELDING TECHNIQUES - DETAILS ON EXTERNAL PIPE PROTECTION - PLANS FOR CATHODIC PROTECTION - PLANS FOR MONITORING CATHODIC PROTECTION - PROVISION FOR PERIODIC SURVEYS OF POTENTIAL TROUBLE SPOTS	"	ON LEASED LAND
2(I)	ELECTRICAL TRANSMISSION FACILITIES	DESIGN AND CONSTRUCTION PER GUIDELINES IN "ENVIRONMENTAL CRITERIA FOR ELECTRIC TRANSMISSION SYSTEM" (U.S.D.I., U.S.D.A. 1970) AND PER REA BULLETIN 61-10.		
2(J)	NATURAL BARRIERS	LESSEE TO CLOSE CUTS MADE INTO NATURAL BARRIERS USED FOR LIVESTOCK CONTROL (CLOSE BY FENCE OR OTHER MEANS)	STANDARDS OF B.L.M.	ON LEASED LAND
(K)	SPECIFICATIONS FOR FENCES AND CATTLE-GUARDS	AS CONSTRUCTED BY LESSEE	STANDARDS OF B.L.M.	

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF [illegible]	LOCATION OF [illegible]
(L)	CROSSINGS	LESSEE TO MINIMIZE DISRUPTION OF EXISTING ROADS, FOOT TRAILS, PIPELINES, AND OTHER RIGHTS-OF-WAY		ON LEASED LAND
		CONSTRUCT SUITABLE OVERHEAD OR UNDERGROUND CROSSINGS	PER DIRECTION OF M.S.	ON LEASED LAND
2(M)	ALTERNATE ROUTES	LESSEE TO PROVIDE ALTERNATE ROADS AND TRAILS WHERE PUBLIC USE IS INTERFACED WITH	PER DIRECTION OF M.S.	ON LEASED LAND
2(N)	OFF-ROAD VEHICLE USE	MANNER OF USE BY LESSEE	APPLICABLE REGULATIONS	ON LEASED LAND
SECTION 3	FIRE PREVENTION AND CONTROL			
3(A)(1)	INSTRUCTIONS OF THE M.S.	USE, PREVENTION AND SUPPRESSION OF FIRES	PER INSTRUCTIONS AND DIRECTIONS OF M.S.	ON LEASED LAND
		REPORTING OF UNCONTROLLED FIRES		WHEREVER OBSERVED BY LESSEE
3(A)(2)(a)		LESSEE TO CONSTRUCT FIRE LINES AND PERFORM CLEARING	PER DIRECTIONS OF M.S.	ON LEASED LAND
(b)		HANDLING, TRANSPORTAION, STORAGE, USE, AND DISPOSAL OF FLAMMABLE LIQUIDS, GASES, AND SOLIDS	NATIONAL FIRE CODES	ON LEASED LAND
3(B)	LIABILITY OF LESSEE	LESSEE LIABLE FOR COSTS OF CONTROL AND SUPPRESSION OF FIRES CAUSED BY HIS EMPLOYEES, CONTRACTORS, SUBCONTRACTORS, OR AGENTS	AS DETERMINED BY M.S.	ON LEASED LAND AND ADJOINING PUBLIC LAND WHERE FIRES HAVE SPREAD
SECTION 4	FISH AND WILDLIFE			
4(A)	MANAGEMENT PLAN	LESSEE TO SUBMIT DETAILED MANAGEMENT PLAN	PER APPROVAL OF M.S.	ON LEASED LAND
		MANAGEMENT PLAN TO ADDRESS		
		- MINIMIZING DAMAGE TO FISH AND WILDLIFE HABITAT INCLUDING WATER SUPPLIES	PER APPROVAL OF M.S.	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
		- RESTORING SUCH HABITAT IF NECESSARY		
		- PROVIDING ALTERNATE HABITATS		
		- PROVIDING ACCESS BY PUBLIC TO WILDLIFE RESOURCES AS MUTUALLY AGREED UPON		
4(B)	MITIGATION OF DAMAGE	LESSEE TO SUBMIT MEASURES PROPOSED TO COMPLY WITH 30 CFR 231.4(b) WHERE SIGNIFICANT DISTURBANCE OF HABITAT IS SEEN TO BE INEVITABLE		
4(C)	BIG GAME	CONSTRUCT BIG GAME DRIFT FENCES		OIL SHALE DEVELOPMENT AREAS

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
(a)	POSTING OF NOTICES	LESSEE TO INFORM EMPLOYEES, AGENTS, CONTRACTORS, SUB-CONTRATORS, AND EMPLOYEES ABOUT REGULATIONS GOVERNING HUNTING, FISHING, TRAPPING		ON LEASED LAND
SECTION 5	HEALTH AND SAFETY			
5(A)	IN GENERAL	LESSEE TO TAKE ALL MEASURES NECESSARY TO PROTECT PERSONS		ON LEASED LANDS
5(B)	COMPLIANCE	COMPLY WITH FEDERAL METAL AND NON-METALLIC MINE SAFETY ACT OF 1966, AND OCCUPATIONAL HEALTH AND SAFETY ACT OF 1970 REF: 30 U.S.C. 721-740 29 U.S.C. 651-678	REF.	ON LEASED LANDS
5(C)	USE OF EXPLOSIVES	LESSEE TO INSURE BLASTING OPERATIONS CONFORM WITH REF. 18 U.S.C. 841-848 AND 26 CFR 181	REF.	ON LEASED LANDS
SECTION 6	HISTORIC AND SCIENTIFIC VALUES			
6(A)	CULTURAL INVESTIGATIONS	PRIOR TO CONSTRUCTION AND MINING OPERATIONS, LESSEE TO CONDUCT CULTURAL INVESTIGATION FOR - INDIAN RUINS - PICTOGRAPHS - OTHER ARCHEOLOGICAL REMAINS		ON ANY PORTION OF LEASED LAND TO BE USED
6(B)	OBJECTS OF HISTORIC OR SCIENTIFIC INTEREST	LESSEE NOT TO APPROPRIATE, REMOVE, INJURE, DEFACE, OR ALTER ANY OBJECT OF ANTIQUITY, OR OF HISTORIC, PREHISTORIC, OR SCIENTIFIC INTEREST	M.S. TO MAKE FINAL DETER-MINATION	ON LEASED LAND
SECTION 7	OIL AND HAZARDOUS MATERIALS			
7(A)	SPILL CONTINGENCY PLANS	LESSEE TO SUBMIT SPILL CONTINGENCY PLANS REF. 86 STAT 816,863 36 FR 16215	TO BE APPROVED BY M.S.	ON LEASED LAND AND WHEREVER OIL OR OTHER HAZARDOUS SUBSTANCES ARE STORED OR TRANSPORTED BY LESSEE
7(B)	RESPONSIBILITY	LESSEE HELD LIABLE FOR ALL DAMAGES RESULTING FROM ANY DISCHARGE OF OIL OR OTHER HAZARDOUS SUBSTANCE	TO BE DETERMINED BY M.S.	
7(C)	REPORTING OF SPILLS AND DISCHARGES	LESSEE TO GIVE IMMEDIATE NOTICE TO M.S. AND OTHERS REQUIRED BY LAW OF ANY SPILLS OR DISCHARGES		ON LEASED LAND
7(D)	STORAGE AND HANDLING	LESSEE TO PROVIDE SAFE STORAGE	TO BE APPROVED BY M.S.	
7(E)	PESTICIDES AND HERBICIDES	LESSEE USE OF PESTICIDES AND HERBICIDES RESTRICTED	PRIOR APPROVAL OF M.S. REQUIRED	ON LEASED LAND
		STORAGE OF PESTICIDES AND HERBICIDES	APPLICABLE STATE AND FEDERAL REGULATIONS	ON LEASED LAND

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
SECTION 8	POLLUTION - AIR			
8(A)	AIR QUALITY	LESSEE TO COMPLY WITH CLEAN AIR ACT AND AMENDMENTS REF. 40 U.S.C. 1857-1857-1	REF.	ON LEASED LAND
8(B)	DUST	LESSEE TO MINIMIZE DUST PROBLEMS ON ROADS AND TRAILS		
		LESSEE TO AVOID CREATING ENVIRONMENTAL OR HEALTH PROBLEMS IN PROCESSING OPERATIONS		
8(C)	BURNING	NOT TO BURN WASTE, TIMBER OR DEBRIS	SUBJECT TO M.S. AUTHORIZATION	
SECTION 9	POLLUTION - WATER			
9(A)	WATER QUALITY	LESSEE TO MINIMIZE POLLUTION	APPLICABLE FEDERAL AND STATE STANDARDS AND M.S. STANDARDS	
		TO AVOID DISCHARGING WASTE WATER INTO AQUIFER THAT IS POTENTIALLY VALUABLE WATER SOURCE	SUBJECT TO M.S. DETERMINATION	
9(B)	DISTURBANCE OF EXISTING WATERS	LESSEE PROHIBITED FROM PERFORMING CONSTRUCTION ACTIVITIES (NOT MINING) THAT MAY - CREATE NEW LAKES - DRAIN EXISTING PONDS - DIVERT NATURAL DRAINAGES - ALTERNATE STREAM HYDRAULICS - DISTURB STREAM BEDS - DEGRADE LAND AND WATER QUALITY - ADVERSELY AFFECT THE ENVIRONMENTAL INTEGRITY OF THE AREA	UNLESS APPROVED BY M.S. IN WRITING	
9(C)	CONTROL OF WASTE MATERIALS	LESSEE TO CONTROL WASTE WATERS CONTAINING TOXIC OR SALINE MATERIALS		
9(C)(1)		- DIVERT SURFACE OR GROUND WATER TO MINIMIZE FORMATION OF SUCH MATERIALS		
9(C)(2)		- DISPOSE OF REFUSE AND SPENT SHALE TO AVOID DISCHARGING SUCH MATERIAL INTO SURFACE OR GROUND WATER		
9(C)(3)		- TERMINATE OPERATIONS IN A WAY TO AVOID THE FORMATION OF SUCH MATERIAL		
9(C)(4)		- DISPOSE OF SUCH MATERIALS TO AVOID POLLUTING GROUND OR SURFACE WATERS		
9(C)(5)		- MONITOR SPOIL AND REFUSE FOR PRESENCE OF UNACCEPTABLE SOLUTES		
9(C)(6)		- AVOID REINJECTING ANY WATER	SUBJECT TO FEDERAL AND STATE STANDARDS, AND M.S. AUTHORIZATION	

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
9(D)	CUTS AND FILLS	LESSEE TO AVOID CUTTING AND FILLING NEAR OR IN STREAMS RESULTING IN SILTATION OR DEBRIS ACCUMULATION	UNLESS AUTHORIZED IN WRITING BY M.S.	
9(E)	CROSSINGS	RESTRICTIONS ON LOCATIONS OF CROSSINGS OF PERENNIAL STREAMS, LAKES AND RIVERS	UNLESS AUTHORIZED IN WRITING BY M.S.	
		MAINTAIN BUFFER STRIPS 200 FEET WIDE ON EACH SIDE OF STREAMS	UNLESS AUTHORIZED IN WRITING BY M.S.	
9(F)	ROAD SURFACING MATERIAL	ROAD SURFACING MATERIAL RESTRICTIONS	SUBJECT TO M.S. APPROVAL	
SECTION 10	POLLUTION - NOISE			
10		LESSEE TO COMPLY WITH STANDARDS	APPLICABLE FEDERAL AND STATE STANDARDS	
		IN ABSENCE OF STANDARDS, LESSEE TO KEEP NOISE AT OR BELOW LEVELS SAFE AND ACCEPTABLE FOR HUMANS	LEVELS TO BE DETERMINED BY M.S.	
SECTION 11	REHABILITATION			
11(A)	IN GENERAL	ALL AFFECTED LANDS TO BE REHABILITATED CONSISTENT WITH OR EQUAL TO PRE-EXISTING LAND USES, INCLUDING METHODS SUCH AS: - LEVELING - BACKFILLING - COVERING WITH TOP SOIL - REVEGETATING SPOIL BANKS AND PIT AREAS	SOUND RESTORATION MEASURES	
		SOIL EROSION AND WATER POLLUTION TO BE MINIMIZED	SOUND RESTORATION MEASURES	
		REHABILITATION TO BE CONCURRENT WITH MINING OPERATIONS WHERE PRACTICABLE	SOUND RESTORATION MEASURES	
		AT TERMINATION OF LEASE LESSEE, TO REHABILITATE PER APPROVED REHABILITATION PLAN (SEE BELOW)	M.S. TO APPROVE PLAN	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
11(B)	MANAGEMENT PLAN	LESSEE TO SUBMIT EROSION CONTROL AND SURFACE REHABILITATION PLAN - PART OF EXPLORATION PLAN - PART OF DEVELOPMENT PLAN - 60 DAYS PRIOR TO START OF MINING SITE PREPARATION - YEARLY UPDATES BEFORE 15 MARCH	M.S. TO APPROVE PLAN	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
		PLAN TO INCLUDE DETAILED INFORMATION ON - ACTIVITIES - AREAS - TIME SCHEDULES - STANDARDS - ACCOMPLISHMENTS - METHODS OF MINIMIZING OIL SHALE DEVELOPMENT IMPACTS	M.S. TO APPROVE PLAN	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSTRUCTIONS
11(B) (CONT.)		PLAN TO BE BASED UPON 100 YEAR PRECIPITATION RATE FOR THE AREA IN CONSIDERING EFFECTS OF - FLASH FLOODS - MUD FLOWS - LANDSLIDES - ROCK FALLS - OTHER SIMILAR MASS MOVEMENTS	M.S. TO APPROVE PLAN	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
11(C)	STABILIZATION OF DISTURBED AREAS	DISTURBED AREAS TO BE LEFT IN STABILIZED CONDITION, BY, FOR EXAMPLE - SEEDING - PLANTING - MULCHING - PLACEMENT OF MAT BINDERS - SOIL BINDERS - ROCK OR GRAVEL BLANKETS	M.S. TO DETERMINE FREQUENCY OF ATTEMPTS TO STABILIZE	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
		LESSEE TO CHIP AND SPREAD VEGETATIVE MATERIAL OF NO VALUE TO AID STABILIZATION	M.S. TO DETERMINE VALUE OF MATERIAL	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
11(D)	SURFACE DISTURBANCE ON SITE	LESSEE TO CORRECT SURFACE DISTURBANCE WHICH MAY INDUCE SOIL MOVEMENT OR WATER POLLUTION	PER REHABILITATION PLAN	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
11(E)	AREAS OF UNSTABLE SOILS	LESSEE TO CONSTRUCT SO AS TO AVOID MASS MOVEMENTS BY CONDUCTING SOIL FOUNDATION INVESTIGATIONS	GOOD ENGINEERING PRACTICES	ON LEASED LAND
11(F)	MATERIALS	ROCK WASTE TO BE UTILIZED FOR CONSTRUCTION PURPOSES. WHEN NOT AVAILABLE, PURCHASE PER 40 CFR 3610	GOOD ENGINEERING PRACTICES	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
		SALE OF SUCH MATERIALS FROM STREAM BEDS AND UPLAND SOIL AREAS TO BE AVOIDED	SUBJECT TO PRIOR APPROVAL OF BUREAU DISTRICT MANAGER	ALL LANDS DISTURBED BY LESSEE'S ACTIVITIES
11(G)	SLOPES OF CUT AND FILL AREAS	ALL CUT AND FILL SLOPES TO BE MAINTAINED IN STABLE CONDITION	GOOD MINING PRACTICES	
11(H)	IMPOUNDMENTS	LESSEE TO ESTABLISH SAFE ACCESS TO PERMANENT WATER IMPOUNDMENTS FOR - PERSONS - LIVESTOCK - WILDLIFE		ON LEASED LAND
		WHERE SUCH ACCESS WOULD BE DETRIMENTAL TO ANIMALS, LESSEE TO PREVENT		ON LEASED LAND
11(I)	FLOOD PLAINS	LESSEE TO AVOID OPERATIONS IN FLOOD PLAINS OR STREAM DRAINAGES THAT RISK - HUMAN LIFE - POLLUTION DAMAGE - DESTRUCTION OF EXISTING ENVIRONMENT	PRIOR APPROVAL OF M.S. REQUIRED	
11(J)	LAND RECLAMATION	LAND RECLAMATION OF SEGMENTS OF OPERATION AREA NO LONGER NEEDED TO BEGIN WITHIN ONE YEAR	UNLESS M.S. APPROVES ALTERNATE SCHEDULE	ON LEASED LAND
11(K)	OVERBURDEN	LESSEE TO SEPARATE OVERBURDEN (TOPSOIL, ROCK MATERIAL) FOR LATER USE AS FILL AND TOP DRESSING	UNLESS M.S. DIRECTS OTHERWISE	

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
11(L)(1)	VEGETATION	LESSEE TO REVEGETATE BY REESTABLISHING FAUNA OF SAME KIND AND NUMBERS AS DETERMINED BY BASE LINE REPORT UNLESS LAND TO BE PUT TO DIFFERENT USE AT TERMINATION OF LEASE	APPROVAL OF M.S. REQUIRED	ALL LEASED LAND
11(L)(2)		REVEGETATION PROGRAM TO BEGIN AT START OF PRODUCTION	APPROVAL OF M.S. REQUIRED	ALL LEASED LAND
11(L)(3)	REVEGETATION	LESSEE TO DEMONSTRATE WHEN D.D.P. SUBMITTED THAT HE HAS REQUIRED REVEGETATION TECHNOLOGY	APPROVAL OF M.S. REQUIRED	ALL LEASED LAND
		ALL OPERATIONS UNDER D.D.P. TO TERMINATE IF ABOVE DEMONSTRATION NOT ACCOMPLISHED BY 10 YEARS AFTER APPROVAL OF D.D.P.	APPROVAL OF M.S. REQUIRED	ALL LEASED LAND
		LESSEE TO SUBMIT ANNUAL REPORTS ON PROGRESS OF PROGRAM TO OBTAIN REQUIRED TECHNOLOGY	APPROVAL OF M.S. REQUIRED	ALL LEASED LAND
		LESSEE MAY RECEIVE CREDIT FOR EXPENDITURES EXCEEDING $500,000 TO OBTAIN TECHOLOGY	SUBJECT TO SECRETARY'S APPROVAL	
SECTION 12	SCENIC VALUES			
12(A)	SCENIC CONSIDERATIONS IN GENERAL	LESSEE TO FOLLOW STANDARDS FOR CONSTRUCTION THAT CONSIDER	GOOD MINING PRACTICES	ON LEASED LAND
12(A)(1) (2) (3) (4) (5)		- COMPATIBLE CONTOURING - USE OF NATURAL COLORING - USE OF NATURAL OPENINGS - MINIMIZING DISTURBED AREAS - RECLAMATION CONSISTENT W/TOPOGRAPHY UNLESS M.S. APPROVES OTHERWISE		
12(B)	CONSIDERATION OF AESTHETIC VALUES	LESSEE TO MAINTAIN EXISTING AESTHETHIC VALUES DURING ALL OPERATIONS BY CONSIDERING - VISUAL IMPACT - NATURAL TOPOGRAPHY - HARMONIOUS LANDSCAPE		ON LEASED LAND
12(C)	PROTECTION OF LANDSCAPE	STRUCTURES AND FACILITIES DESIGNED BY LESSEE TO BLEND WITH NATURAL LANDSCAPE		
12(D)	SIGNS	SIGNS TO BE RUSTIC IN APPEARANCE	PER B.L.M. STANDARDS	ON LEASED LAND
SECTION 13	VEGETATION			
13(A)(1)	IN GENERAL	LESSEE TO AVOID CUTTING AND REMOVING VEGETATIVE MATERIAL ON OR OUTSIDE CLEARING BOUNDARIES	SUBJECT TO M.S. APPROVAL	ON LEASED LAND
13(A)(2)		ALL WOODY MATERIAL CUT DURING CLEARING OPERATIONS TO BE FELLED IN RIGHT-OF-WAY AND AWAY FROM LIVE WATER COURSES		ON LEASED LAND
13(B)	TIMBER	TIMBER CLEARING LIMITS TO BE FIVE FEET OUTSIDE OF ANY CUT OR FILL		
		WOODY MATERIAL OF NO VALUE TO BE MECHANICALLY CHIPPED AND SPREAD TO AID REVEGATATION		

SECTION OF ENVIRONMENTAL STIPULATIONS	TITLE	ITEM	UNITS OF MEASURE	LOCATION OF OBSERVATIONS
13(B) Contd.	TIMBER	CLEARING BOUNDARIES TO BE IDENTIFIED PRIOR TO CLEARING		
13(C)	CLEARING AND STRIPPING	LESSEE MAY CLEAR AND STRIP LAND FOR ROADBEDS, BUT NOT MORE THAN 25 FEET FROM CENTERLINE	UNLESS OTHERWISE SPECIFIED BY M.S.	
SECTION 14	WASTE DISPOSAL			
14(A)	MINEWASTE	IN ACCORDANCE WITH D.D.P., LESSEE TO COMPACT EXCAVATED MATERIAL AND SPENT SHALE TO MINIMIZE EROSION		ON LEASED LAND
		SLOPE FACES OF WASTE PILES SHALL BE STABLE AND SHALL BE REVEGETATED PER REHABILITATION PLAN		"
14(B)	OTHER DISPOSAL AREAS	LESSEE TO SUBMIT PLAN FOR DISPOSING OF WASTE OTHER THAN MINE WASTE	PER APPROVAL OF M.S.	"
		PLAN TO CONSIDER COLLECTION, RECYCLING OR DISPOSAL IN SANITARY LAND FILLS OR OTHER DISPOSAL AREAS	"	"
		PLAN TO BE IN-ACCORD WITH STATE REGULATIONS, U.S. PUBLIC HEALTH SERVICE, AND EPA	"	"
14(C)	DISPOSAL OF SOLID AND LIQUID WASTES	SOLID AND LIQUID WASTE DISPOSAL SITES MUST - AVOID LANDSLIDES - CONTROL WEATHER EROSION - AID VEGETATIVE GROWTH	"	"
		ABOVE SITES TO AVOID DOWNWARD PERCOLATION OF LEACHED PRODUCTS AND OTHER POLLUTANTS INTO AQUIFERS	"	"
14(D)	IMPOUNDMENT OF WATER	NO DISPOSAL OF WASTE OR RESIDUE UNLESS PLANS FOR DIVERSION AND PREVENTION OF CONTAMINATION HAVE BEEN PREPARED AND COMPLIED WITH	M.S. TO APPROVE APPROVE PLANS	
14(E)	SLURRY WASTE DISPOSAL	LESSEE TO PROVIDE IMPOUNDMENTS TO CONTAIN LANDSLIDES, MUD FLOWS OR WASTE PILE BLOWOUT.		

APPENDIX I-4

OIL SHALE LEASE AND OIL SHALE LEASE ENVIRONMENTAL STIPULATIONS

CHAPTER II—BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR

APPENDIX—PUBLIC LAND ORDERS

[Public Land Order 5401]

COLORADO, UTAH, WYOMING

Modification of Oil Shale Withdrawal

By virtue of the authority vested in the President, and pursuant to Executive Order No. 10355 of May 26, 1952 (17 FR 4831), it is ordered as follows:

1. Executive Order No. 5327 of April 15, 1930, withdrawing oil shale deposits and land containing such deposits for classification, is hereby modified to permit, at the discretion of the Secretary, the issuance of leases of oil shale deposits, and the land containing such deposits, so far as it relates to the following described land:

COLORADO

SIXTH PRINCIPAL MERIDIAN

Tract C-a

T. 1 S., R. 99 W.,
Sec. 32, E½, E½W½;
Sec. 33;
Sec. 34, W½, SE¼, W½NE¼, SE¼NE¼.
T. 2 S., R. 99 W.,
Secs. 3 and 4;
Sec. 5, E½, E½W½;
Sec. 8, E½;
Secs. 9 and 10.

Tract C-b

T. 3 S., R. 96 W.,
Sec. 5, W½SE¼, SW¼;
Sec. 6, lots 6 and 7, E½SW¼, SE¼;
Sec. 7, lots 1, 2, 3, 4, E½W½, E½;
Sec. 8, W½NE¼, NW¼, S½;
Sec. 9, SW¼;
Sec. 16, NW¼, W½SW¼;
Sec. 17;
Sec. 18, lots 1, 2, 3, 4, E½W½, E½.
T. 3 S., R. 97 W.,
Sec. 1, S½;
Sec. 2, SE¼;
Sec. 11, E½;
Sec. 12;
Sec. 13, N½;
Sec. 14, N½NE¼.

The two tracts described above contain 10,183.60 acres.

UTAH

SALT LAKE MERIDIAN

Tract U-a

T. 10 S., R. 24 E.,
Sec. 19 E½;
Secs. 20, 21, 22, 27, 28, 29;
Sec. 30, E½;
Sec. 33, N½;
Sec. 34, N½.

Tract U-b

T. 10 S., R. 24 E.,
Sec. 12, S½, S½N½;
Secs. 13, 14, 23, 24;
Sec. 25, W½W½;
Sec. 26.
T. 10 S., R. 25 E.,
Secs. 18 and 19.

The two tracts described above contain 10,240 acres.

WYOMING

SIXTH PRINCIPAL MERIDIAN

Tract W-a

T. 14 N., R. 99 W.,
Secs. 17 and 18;
Sec. 19, NE¼;
Secs. 20, 21, 22, 27, 28;
Sec. 29, N½, SE¼.

Tract W-b

T. 13 N., R. 99 W.,
Sec. 1, S½, S½N½, lots 1, 3, 4;
Secs. 2 and 3;
Sec. 4, lot 1, SE¼NE¼;
Sec. 10, E½, E½NW¼;
Secs. 11 and 12.
T. 14 N., R. 99 W.,
Sec. 33, E½E½;
Secs. 34 and 35.

The two tracts described above contain 10,194.48 acres. The total areas described aggregate approximately 30,618.08 acres.

2. The lands described in paragraph 1 of this order will not be available for lease until a notice of sale of leases is published in the FEDERAL REGISTER announcing the terms and conditions under which leases on these tracts will be offered. Any application to lease not submitted in accordance with the requirements prescribed in that notice of sale will be rejected.

JOHN C. WHITAKER,
Under Secretary of the Interior.

NOVEMBER 26, 1973.

[FR Doc.73-25371 Filed 11-29-73;8:45 am]

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

OIL SHALE LEASES

Notice of Sale; Corrections

In 38 FR, 33187, column 3, paragraph 5, Payment of bonus and advance rental: Change line 19 from "draft, moneyo rder, or cash for the first", to "draft money order, or cash for the first".

In 38 FR 33187, column 3, paragraph 6, Evidence of qualifications: Paragraph (a), page 33188, column 1, change line 36 from: "tary of the corporaltion", to "tary of the corporation", change line 40 from, "which such articles and authority", to "which such articles and authority".

In 38 FR, 33188, column 2, paragraph 10, Withdrawal of additional lands: Change line 15" from "with the disposal of spend shale", to "with the disposal of spent shale".

In 38 FR, 33189, column 2, section 2, Grant to lessee. Change line 13 from "reasonable convenient for the mining", to "reasonably convenient for the mining".

In 38 FR, 33190, section 7, Royalties (C), change line 8 from "the Leased [illegible]s for processing or sale of", to "the [illegible]sed Lands for processing or sale by."

In 38 FR 33192, section 18, Reports, maps, etc. (a), change line 19 from "some other agency having personal knowl-", to "some other agent having personal knowl-".

In 38 FR 33197, column 1, section 7, Oil and Hazardous Materials, (C) Reporting of Spills and Discharges. Change line 1 from: "The Lessee shall give immedaite notice of", to "The Lessee shall give immediate notice of".

ED HASTEY,
Acting Director,
Bureau of Land Management.

Approved: December 5, 1973.

JACK O. HORTON,
Assistant Secretary of the Interior.

[FR Doc.73-26107 Filed 12-6-73;8:45 am]

OIL SHALE LEASES

Notice of Sale; Corrections

In section 1(C)(1) of the Oil Shale Lease Environmental Stipulations change lines 29 through 33, column 3, page 33194, volume 38 of the FEDERAL REGISTER, published on November 30, 1973, from:

"In paragraph (3) of this subsection. Once the monitoring program has begun the baseline data shall be collected continuously as long as the Mining Supervisor shall require under paragraph (3) of this subsection. The baseline data shall be conducted for at least one full year prior to the submission of the detailed development plan under section 10(a) of this lease. The plan shall, at the discretion, or with the approval, of the Mining Supervisor, be modified at any time as necessary as a result of study of the baseline data obtained after the submission of the plan. Exploratory operations, as approved by"

to:

"In paragraph (2) of this subsection. The baseline data shall be collected for a period of at least two consecutive full years, one full year of which shall be prior to the submission of the detailed development plan under section 10(a) of this lease. If the detailed development plan is submitted prior to the collection of the second year's data, the plan already submitted shall, at the discretion, or with the approval, of the Mining Supervisor, be modified as necessary as a result of study of the additional baseline data Exploratory operations, as approved by".

In section 1(C)(2) of the Oil Shale Lease Environmental Stipulations change line 48, column 3, page 33194, volume 38 of the FEDERAL REGISTER, from "visor. The monitoring program shall, there-" to

"visor. After the collection of the required baseline data for at least two years, the Lessee shall not be required to conduct a monitoring program on the Leased Lands until a date six months prior to the commencement of development operations. The monitoring program shall, there-".

ED HASTEY,
Acting Director,
Bureau of Land Management.

Approved: December 6, 1973.

JACK O. HORTON,
Assistant Secretary of the Interior.

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

OIL SHALE LEASES

Notice of Sale

Pursuant to the Act of February 25, 1920 (41 Stat. 437), as amended (30 U.S.C. 181-263), the oil shale deposits in six tracts of land (two in Colorado, two in Utah, and two in Wyoming) will be offered for lease through competitive bidding. The six sales will be held sequentially, one every second Tuesday of the month, beginning January 8, 1974, as follows: TRACT C-a in Colorado will be offered for lease on January 8, 1974; TRACT C-b in Colorado will be offered on February 12, 1974; TRACT U-a in Utah will be offered on March 12, 1974; Utah TRACT U-b on April 9, 1974; Wyoming TRACT W-a on May 13, 1974; and Wyoming TRACT W-b on June 11, 1974. These tracts are more particularly described as follows:

COLORADO

TRACT C-a:

T. 1 S., R. 99 W., 6th P.M.,
Sec. 32, E½, E½W½;
Sec. 33, all;
Sec. 34, W½, SE¼, W½NE¼, SE¼NE¼.
T. 2 S., R. 99 W., 6th P.M.,
Sec. 3, all;
Sec. 4, all;
Sec. 5, E½, E½W½ (incl. lots 1, 2, and 3);
Sec. 8, E½;
Sec. 9, all;
Sec. 10, all.

The area described aggregates 5,089.70 acres.

TRACT C-b:

T. 3 S., R. 96 W., 6th P.M.,
Sec. 5, W½SE¼, SW¼;
Sec. 6, lots 6 and 7, E½SW¼, SE¼;
Sec. 7, lots 1, 2, 3, and 4, E½W½, E½;
Sec. 8, W½NE¼, NW¼, S½;
Sec. 9, SW¼;
Sec. 16, NW¼, W½SW¼;
Sec. 17, all;
Sec. 18, lots 1, 2, 3, and 4, E½W½, E½.
T. 3 S., R. 97 W., 6th P.M.,
Sec. 1, S½;
Sec. 2, SE¼;
Sec. 11, E½;
Sec. 12, all;
Sec. 13, N½;
Sec. 14, N½NE¼.

The area described aggregates 5,093.90 acres.

UTAH

TRACT U-a:

T. 10 S., R. 24 E., S.L.M.,
Sec. 19, E½;
Sec. 20, all;
Sec. 21, all;
Sec. 22, all;
Sec. 27, all;
Sec. 28, all;
Sec. 29, all;
Sec. 30, E½;
Sec. 33, N½;
Sec. 34, N½.

The area described aggregates 5,120.00 acres.

TRACT U-b:

T. 10 S., R. 24 E., S.L.M.,
Sec. 12, S½, S½N½;
Sec. 13, all;
Sec. 14, all;
Sec. 23, all;
Sec. 24, all;
Sec. 25, W½W½;
Sec. 26, all.
T. 10 S., R. 25 E., S.L.M.,
Sec. 18, all;
Sec. 19, all.

The area described aggregates 5,120.00 acres.

WYOMING

TRACT W-a:

T. 14 N., R. 99 W., 6th P.M.,
Sec. 17, all;
Sec. 18, all;
Sec. 19, NE¼;
Sec. 20, all;
Sec. 21, all;
Sec. 22, all;
Sec. 27, all;
Sec. 28, all;
Sec. 29, N½, SE¼.

The area described aggregates 5,111.24 acres.

TRACT W-b:

T. 13 N., R. 99 W., 6th P.M.,
Sec. 1, S½, S½N½, lots 1, 3, and 4;
Sec. 2, all;
Sec. 3, all;
Sec. 4, Lot 1, SE¼NE¼;
Sec. 10, E½, E½NW¼;
Sec. 11, all;
Sec. 12, all.
T. 14 N., R. 99 W., 6th P.M.,
Sec. 33, E½E½;
Sec. 34, all;
Sec. 35, all.

The area described aggregates 5,083.24 acres.

Announcement of each sale will be made by publication of a special notice in the FEDERAL REGISTER and in a newspaper of general circulation in the State and county in which the offered lands are located, setting forth the date, time, place, and conditions of the sale. If there is no newspaper in the county in which the lands are situated, then publication of the notice of sale will be made in a newspaper in the general area of the offered lands.

1. *Acreage limitations:* Not more than one lease shall be granted to any one person, association, or corporation.

2. *Lease terms:* The leases will be issued on a form the full text of which is published as Appendix "A" to this notice. The lease will be issued for a period of 20 years and so long thereafter as production is had in commercial quantities, subject to readjustment of terms at the end of each 20-year period. The lessee will be required to pay royalty on production in the amount and manner prescribed in Section 7 of the lease, and to maintain a bond as provided in Section 9.

3. *Minimum Royalty:* Section (7) (e) (1) of the lease form requires the payment of a minimum royalty for the sixth and each succeeding year which shall be based upon a different production rate for each tract and upon different grades of oil shale for certain tracts. The production rates and oil shale grades for each tract are as follows:

Tract	Shale grade gallon/ton	6th year production rate 1,000's ton/year	15th year production rate 1,000's ton/year
Tract C-a..	30	1,130	11,300
Tract C-b..	30	616	6,160
Tract U-a..	30	208	2,080
Tract U-b..	30	227	2,270
Tract W-a..	30	215	2,150
Tract W-b..	30	214	2,140

4. *Bidding procedures:* Leases will be offered competitively through sealed bidding. A lease will be issued only to the qualified bidder submitting the highest amount per acre as a bonus for the privilege of leasing the lands. No specific form of bid is required but all bids must identify the lease sale and must show the total amount bid, the amount bid per acre, and the amount submitted with the bid. No telephonic or telegraphic bids will be accepted, and no oil payment, overriding royalty, logarithmic, or sliding scale bid will be considered. Bids shall not be modified after they have been submitted. Bids must be for the full tract described in the special notice of sale of oil shale lease. Bids must be submitted in sealed envelopes plainly marked "Sealed Bid for Oil Shale Lease. Not to be opened before 10 a.m., M.S.T. on (*date of sale*)." Bids may be mailed or delivered in person to the addressee named in the special notice until 10 a.m., M.S.T. on the date of the sale. Bids received after that time will be returned unopened. Bidders are warned against violation of section 1860 in Title 18 U.S.C. prohibiting unlawful combination or intimidation of bidders.

5. *Payment of bonus and advance rental:* All bids must be accompanied by a certified check, cashier's check, bank draft, money order, or cash for one-fifth of the bonus bid payable to the Bureau of Land Management, which amount shall be returned to the bidder after the lease sale should he be an unsuccessful bidder. If the bidder, after being notified that his bid has been accepted and that he will be awarded a lease, fails to comply with the applicable regulations or the terms of this notice, or if he fails to execute the lease within 15 days after receiving the lease form, his deposit will be forfeited.

Each bid must also be accompanied by a certified check, cashier's check, bank draft, moneyo rder, or cash for the first year's annual rental at the rate of 50¢ per acre or fraction thereof, which amount shall be returned to all unsuccessful bidders after the lease sale.

6. *Evidence of qualifications:* Each bid must be accompanied by a statement over the bidder's signature or that of his authorized agent with respect to his

qualifications. The statement shall contain the following information:

(a) If the bidder is an individual, a statement as to whether native born or naturalized; if an association, it must submit a certified copy of the articles of association and a statement by its members as to their citizenship. If the bidder is a corporation, it must submit statements showing: (i) the State in which it is incorporated; (i) that it is authorized to hold leases for oil shale deposits, and the names of the officers authorized to act in such matters in behalf of the corporation; (iii) the percentage of the corporate voting stock and of all the stock owned by aliens or those having addresses outside the United States; and (iv) the name, address, and citizenship of any stockholder owning or controlling 20 percent or more of the corporate stock of any class. If more than 10 percent of the stock is owned or controlled by or in behalf of aliens, or persons who have addresses outside the United States, the corporation must give their names and addresses, the amount and class of stock held by each, and to the extent known to the corporation or which reasonably can be ascertained by it, the facts as to the citizenship of each. The bid of a corporation also shall be accompanied by a copy either of the minutes of the meeting of the board of directors or of the by-laws indicating that the person signing the bid has authority to do so, or, in lieu of such a copy, a certificate by the Secretary of the corporatiton to that effect, over the corporate seal, or appropriate reference to the record of the Bureau of Land Management in connection with which such aticles and authority have been furnished previously; and

(b) The certification required by 41 CFR 60-1.7(b) and Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375, on Form 1140-8 (November 1973) and Form 1140-7 (December 1971).

7. *Bid opening:* The bids will be opened at the place, date and time announced in the notice of publication of the respective oil shale lease sales. The opening of bids is for the purpose of publicly announcing and recording bids received and no bids will be accepted or rejected at that time. If the Department is prohibited for any reason from opening any bid before midnight of the day of the sale for which it is submitted, that bid will be returned unopened to the bidder as soon thereafter as possible.

8. *Acceptance or rejection of bids:* No bid for any tract will be accepted and no lease for any tract will be awarded to any bidder unless the bidder has complied with all requirements of the notice, his bid is the highest for the offered tract, and the amount of the bonus bid has been determined to be adequate by the United States. The Government reserves the right to reject any or all bids. Any cash, checks, drafts, or money orders submitted with the bid may be deposited in an unearned escrow account in the Treasury during the period the bids are being considered. Such a deposit does not constitute and shall not be construed as acceptance of any bids on behalf of the United States.

9. *Preliminary Development Plan:* Within forty-eight hours after being informed that his bid has been accepted and that a lease will be issued to him, the successful bidder must transmit a preliminary development plan, in duplicate, to the Officer conducting the lease sale. This plan will be made public upon issuance of the lease, and, therefore, confidential information relative to the lessee's operations should not be included in the submission. Confidential information should be submitted in the same manner, but under separate cover. The submission or acceptance of these plans will not be binding on the lessee or lessor and will not authorize any action by the lessee, but the plan is required for the lessor's guidance in establishing initial supervision of the lessee's activities. The preliminary development plan should indicate the method of development, the proposed location of on and off-site facilities, the schedule for development, and monitoring programs to determine environmental criteria.

10. *Withdrawal of additional lands:* The Department recognizes that in some situations lands outside the leased tracts may be required under other statutes than the Mineral Leasing Act for roads or other purposes in connection with the prototype oil shale leasing program. Moreover, since this is a prototype rather than a general leasing program, the Department may in the future find it desirable to conduct investigations, studies, and experiments under section 101 of the Public Land Administration Act (43 U.S.C. § 1362), particularly in connection with the disposal of spend shale. In order to facilitate these possible future investigations, studies, and experiments, the Department is withdrawing from all forms of appropriation under the public land laws, including the mining laws, certain lands in the vicinity of the tracts offered for lease.

11. Further information concerning these oil shale lease sales may be obtained from the Oil Shale Coordinator, Room 5623, Interior Building, Washington, D.C. 20240; the Deputy Oil Shale Coordinator, Building 56, Denver Federal Center, Denver, Colorado, the Chief, Division of Upland Minerals, Bureau of Land Management, Room 7146, Interior Building, 18th & C Streets NW., Washington, D.C. 20240; the State Director, Colorado State Office, Bureau of Land Management, Room 700, Colorado State Bank Building, 1600 Broadway, Denver, Colorado 80202; the State Director, Utah State Office, Bureau of Land Management, Federal Building, 125 South State, Salt Lake City, Utah 84138; and the State Director, Wyoming State Office, Bureau of Land Management, Joseph C. O'Mahoney Federal Center, 2120 Capital Avenue, Cheyenne, Wyoming 82001.

CURT BERKLUND,
Director,
Bureau of Land Management.

Approved: November 26, 1973.

JOHN C. WHITAKER,
Under Secretary of the Interior.

APPENDIX A

OIL SHALE LEASE

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UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

Oil Shale Lease

In consideration of the mutual promises, terms and conditions contained herein, and the grant made hereby, this lease is entered into on ----------, ------, to be effective on ----------, ------, (hereinafter called the "Effective Date"), by the United States of America (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau") of the Department of the Interior (hereinafter called the "Department"), and ----------
---------- (hereinafter called the "Lessee"), pursuant and subject to the terms and provisions of the Mineral Leasing Act of February 25, 1920 (41 Stat. 437), as amended (30 U.S.C. §§ 181–263) (hereinafter called the "Act"), and to the terms, conditions, and requirements (1) of all regulations promulgated by the Secretary of the Interior (hereinafter called the "Secretary") in existence upon the Effective Date, specifically including, but not limited to, the regulations in 30 CFR Part 231 and 43 CFR Part 23 and Group 3000, all of which are incorporated herein and, by reference, made a part hereof; and (2) of all regulations hereafter promulgated by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference), all of which shall be, upon their effective date, incorporated in and, by reference, made a part of this lease.

Section 1. *Definitions.* As used in this lease:

(a) "Oil Shale" means a fine-grained sedimentary rock containing: (1) organic matter which was derived chiefly from aquatic organisms or waxy spores or pollen grains, which is only slightly soluble in ordinary petroleum solvents, and of which a large proportion is distillable into synthetic petroleum, and (2) inorganic matter which may contain other minerals. This term is applicable to any argillaceous, carbonate, or siliceous sedimentary rock which, through destructive distillation will yield synthetic petroleum. The products of Oil Shale include both shale oil and other minerals;

(b) "Leased Lands" means ----------
---------- situated in the County of ----------, State of ---------- containing ---------- acres, more or less;

(c) "Leased Deposits" means all deposits of Oil Shale lying within or under the Leased Lands;

(d) "Anniversary Date" means the anniversary of the Effective Date of this lease; however, if operations under this lease are suspended pursuant to section 39 of the Act (30 U.S.C. § 209), the next Anniversary Date of this lease after the suspension shall follow the previous Anniversary Date by a period of time equal to the sum of one year and the period of suspension, and subsequent Anniversary Dates will be measured from that Anniversary Date;

(e) "Lease Year" means the period of time between two successive Anniversary Dates of this lease;

(f) "Ton" means a measure of weight of 2,000 pounds avoirdupois;

(g) "Mining Supervisor" means the appropriate mining supervisor of the United States Geological Survey (hereinafter called the "Geological Survey"), as defined in 30 CFR 231.2(c); and

(h) "Commercial Quantities" means quantities sufficient to provide a return after all variable costs of production have been met.

Sec. 2. *Grant to lessee.* The Lessee is hereby granted, subject to the terms of this lease, the exclusive right and privilege to prospect for, mine by underground or surface means and process by retorting or by *in situ* methods or otherwise, as he may reasonably choose and in accordance with approved plans, utilize, and dispose of all Leased Deposits together with the right to construct on the Leased Lands all such works, buildings, plants, structures, roads, powerlines, and additional facilities as may be necessary or reasonable convenient for the mining, processing, and preparation of products of the Leased Deposits for market and the housing and welfare of the Lessee's employees, agents, and contractors, and to use so much of the surface of the Leased Lands as may reasonably be required in the exercise of the rights and privileges herein granted.

Sec. 3. *Lessor's reserved interests in the Leased Lands.* The Lessor reserves the following:

(a) The right to lease, sell, or otherwise dispose of the surface of the Leased Lands or of any surface or mineral resource in the Leased Lands (or of any interest therein) under existing laws or laws hereafter enacted, subject to the rights of the Lessee under this lease;

(b) The right, upon such terms as it may determine to be just, to permit for joint or several use, such easements or rights-of-way, including easements in tunnels upon, through, or in the Leased Lands, as may be necessary or appropriate to the working of the Leased Lands or other lands containing mineral deposits subject to the Act, and the treatment and shipment of the products thereof by or under authority of the Lessor, its Lessees, or permittees, and for other public purposes; and

(c) The right to conduct and to authorize geological and other investigations on the Leased Lands which do not interfere with or endanger operations under this lease.

Sec. 4. *Lease Term.* This lease shall be for a period of 20 Lease Years from the Effective Date and so long thereafter as there is production from the Leased Deposits in commercial quantities, subject to the provisions of section 23 with respect to the readjustment of terms and conditions and the right of the parties to terminate the lease.

Sec. 5. *Bonus.* In addition to all other payments required hereunder, the Lessee shall pay to the Lessor the amount of $------ as a bonus. This bonus shall be due and payable in five installments as follows: Receipt of $------ at the time of the sale as the first installment is hereby acknowledged by the Lessor; the balance shall be paid in four equal annual installments of $------ due and payable on each of the first four Anniversary Dates of this lease. In the event the Secretary accepts a surrender or relinquishment of this lease filed by the Lessee at any time prior to the third Anniversary Date, the Lessee shall be released from any obligation to pay the fourth and fifth bonus installments required hereunder. That release shall not relieve the Lessee of the obligation to pay installments which had accrued prior to the filing of the surrender or relinquishment of the lease, but had not been paid prior to the Secretary's acceptance of that surrender or relinquishment. The Lessee may credit against the fourth bonus installment any expenditures prior to the third Anniversary Date directly attributable to operations under this lease on the Leased Lands for the development of the Leased Deposits, but not any expenditures attributable to the preparation of a development plan under section 10 of this lease. Upon the credit of an expenditure, the Lessee shall be relieved of the duty of paying the equivalent amount of the fourth bonus installment. Similarly, the Lessee may credit against the fifth bonus installment any expenditures prior to the fourth Anniversary Date directly attributable to operations under this lease on the Leased Lands for the development of the Leased Deposits and not credited against the fourth bonus installment, but not any expenditures attributable to the preparation of a development plan under section 10. Upon the credit of an expenditure, the Lessee shall be relieved of the duty of paying the equivalent amount of the fifth bonus installment. The Mining Supervisor shall have the duty of determining whether expenditures credited by the Lessee are properly attributable to such operations, and, if the Mining Supervisor determines that any reported expenditure is not attributable to such operations, the Lessee shall not receive credit for that expenditure.

Sec. 6. *Rentals.* The Lessee shall pay the Lessor an annual rental which shall be in the amount of 50 cents for each acre or fraction of an acre of the Leased Lands. The Lessee shall pay the rental for each subsequent Lease Year on or before the first day of that Lease Year. Rentals for any Lease Year shall be credited by the Lessor against any royalty payments for that Lease Year.

Sec. 7. *Royalties.* (a) The Lessee shall pay to the Lessor a royalty on all Oil Shale extracted by the Lessee from the Leased Lands which is either processed or sold by the Lessee. The royalty on Oil Shale shall be computed separately for shale oil and for other minerals as follows:

(1) The royalty on shale oil shall be computed on the basis of the shale oil content of the Oil Shale; the method of computing the royalty shall depend upon whether the Oil Shale is extracted by mining methods or processed by *in situ* methods.

(I) If the Oil Shale is extracted by mining methods, the Lessee shall pay the Lessor a basic royalty rate of 12 cents on every Ton of Oil Shale which the Lessee either processes under this Lease either on or off the Leased Lands or sells prior to processing. This basic royalty rate shall be subject to the following adjustments:

(A) If the shale oil content of the Oil Shale mined is less than 30 gallons per Ton, the basic royalty rate per Ton of Oil Shale shall be reduced by one cent for each gallon or fraction thereof that the shale oil content is less than 30 gallons per Ton, but in no event shall the royalty rate be less than four cents per Ton. If the shale oil content of the Oil Shale mined is more than 30 gallons per Ton, the basic royalty rate per Ton shall be increased by one cent for each gallon or fraction thereof that the shale oil content is more than 30 gallons per Ton.

(B) For the calendar year in which the Effective Date occurs and for each calendar year thereafter, the Secretary shall determine the combined average value per barrel of all crude oil and crude shale oil produced in the States of Colorado, Utah, and Wyoming. The basic royalty rate applicable to the second and each succeeding Lease Year shall be adjusted by an increase or decrease of the same percentage as the percentage of increase or decrease in the combined average value for the calendar year during which that Lease Year begins as compared with the combined average value for the calendar year during which the previous Lease Year began. However, in no event shall the basic royalty rate for shale oil be decreased to less than 4 cents on every Ton of Oil Shale mined under the lease.

(C) The shale oil content of the Oil Shale shall be determined either by the Modified Fischer Assay method or by such other method as the Lessor and the Lessee adopt, and the royalty shall be based on the monthly average of shale oil content of all Oil Shale processed under this lease or transferred from the Leased Lands for processing or sale of the Lessee. Computations of quantities, assays and royalties shall be rounded to the nearest hundredth, or within the limits of the standard deviation for commercial testing equipment as approved by the Mining Supervisor.

(II) (A) If the Oil Shale is processed by *in situ* methods, royalty shall be paid at a basic royalty rate of 12 cents per Ton. The number of Tons processed shall, for purposes of computing royalty, be determined by: (I) establishing through calorimetric tests designated by the American Society for Testing and Materials as "Standard" or "Tentative," the total gross heat of combustion in BTUs of all oil and gas products at the well head, adjusted downward by the total gross heat of combustion in BTUs of combustible fluids (gases or liquids) injected as heat carriers, but not for fuel purposes, into the formation being processed; (II) dividing the adjusted total gross heat of combustion in BTUs by 152,700 BTUs (shale oil and gas recovered by Modified Fischer Assay of Oil Shales, containing approximately 30 gallons of shale oil per Ton, has a heating value of 152,700 BTUs per gallon of shale oil and associated gas), to arrive at the equivalent number of gallons of shale oil produced; and (III) dividing the equivalent number of gallons of shale oil produced by 30, to arrive at the number of Tons of Oil Shale processed by *in situ* methods.

(B) The basic royalty rate applicable to shale oil from Oil Shale process by *in situ* methods shall be adjusted in the same manner as that provided in paragraph (a)(1)(I)(B) of this section for the adjustment of the basic royalty rate applicable to shall oil processed from Oil Shale extracted by mining methods.

(C) Computations of quantities, assays and royalties relating to tonnage of Oil Shale shall be determined by the same standards as used under Section 7 (a)(1)(I)(C).

(2) The Lessee shall also pay a royalty on all minerals other than shale oil contained in Oil Shale produced from the Leased Deposits which the Lessee processes, either on or off the Leased Lands, or sells. This royalty shall be computed on the basis of the gross value of the other minerals at the point of shipment to market, and shall be at a rate of 3 per centum for the first ten Lease Years, 4 per centum for the eleventh year through the fifteenth Lease Year, and 5 per centum beginning with the sixteenth Lease Year.

(b) The Lessee shall determine accurately, on the Leased Lands, the weight or quantity and quality of all Oil Shale produced from the Leased Deposits by each method used and shall enter the weight or quantity and quality thereof accurately in books which shall be kept and preserved by the Lessee for such purposes.

(c) Payments for royalties due under this lease shall be payable monthly on or before the last day of the calendar month following the calendar month in which the Oil Shale is processed or, if it is not processed, is sold.

(d) If the Lessee shall show that compliance with the requirements for environmental protection prescribed in the detailed development plan (or amended, supplemental, or partial plan) required under section 10 of this lease, and as approved in accordance with the regulations in 43 CFR Part 23 and 30 CFR Part 231, now or hereinafter in force, or imposed by legislation enacted after the effective date of that plan (or of an amendment or supplement to that plan), has engendered or will engender extraordinary costs in an amount which is in excess of those in the contemplation of the parties, as determined by the Lessor, on the effective date of that plan (or amendment or supplement to that plan), and the Secretary, if he deems it desirable, may, in order to offset such costs, adjust the royalties that would otherwise become due and payable thereafter under subsection (a) of this section by allowing a credit against those royalties in such an amount, and for such a time as he determines is warranted in the circumstances.

(e)(1) For the sixth and each succeeding Lease Year the Lessee shall pay a minimum royalty which, to the extent that royalties on production during that Lease Year in that amount have not been previously paid, shall be due and payable on the Anniversary Date at the end of that Lease Year. For the sixth Lease Year, the Lessee's minimum royalty shall be equal to the royalty due on shale oil under subsection (a)(1)(I) of this section on an annual production rate of ——— Tons of Oil Shale containing ——— gallons of shale oil per Ton of Oil Shale. The annual production rate for computing minimum royalty for each subsequent Lease Year up to and including the fifteenth Lease Year shall increase in an amount of ——— Tons of Oil Shale per year for each subsequent Lease Year; for the fifteenth and each subsequent Lease Year the annual rate shall be ——— Tons of Oil Shale. The Secretary may excuse the Lessee from compliance, in whole or in part, with the requirements of this paragraph (1) of subsection (e) during any year in which the Lessee is prevented by circumstances over which he has no control from implementing a development plan submitted under Section 10 of this lease.

(2) The Lessee may credit against any minimum royalty due on the sixth Anniversary Date or any subsequent Anniversary Date up to and including the tenth Anniversary Date the amount of any expenditures which are made between the approval of the development plan under section 10 of this lease and the tenth Anniversary Date and which are directly attributable to operations on the Leased Lands pursuant to that development plan for the development of the Leased Deposits and which were not credited against the fourth and fifth bonus installments. The Mining Supervisor shall have the duty of determining whether expenditures credited by the Lessee are attributable to such operations, and, if the Mining Supervisor determines that any reported expenditure is not attributable to such operations, the Lessee shall not receive credit for the expenditure. Upon the credit of an expenditure against the minimum royalty due, the Lessee will be relieved of the duty of paying the equivalent amount of minimum royalty: *Provided, however,* That, if there is actual production in the sixth or any subsequent Lease Year, the Lessee shall not be permitted to credit expenditures against the first $10,000 of minimum royalty due for that Lease Year.

(f) If the Lessee enters into production prior to the eighth Anniversary Date, and the royalty due in the eighth or any previous Lease Year exceeds the minimum royalty due under subsection (e)(1) of this section for that Lease Year, the Lessee shall be relieved from the payment of one-half of the difference between the actual royalty due for that Lease Year and the figure set in subsection (e)(1) for minimum royalty due for that Lease Year. This relief from the payment of royalty shall be in addition to any crediting of expenditures under subsection (e)(2) of this section, but no crediting of expenditures against minimum royalty shall reduce the figure for minimum royalty used in the preceding sentence.

Sec. 8. *Payments.* All bonus installments shall be paid to the appropriate State Office of the Bureau. All rental payments shall be made to the appropriate State Office of the Bureau until this lease enters a producing status or minimum royalty is required to be paid on it; thereafter the rentals and royalties shall be paid to the appropriate Mining Supervisor with whom all reports (including any reports on expenditures deductible under section 5) concerning operations under the lease shall be filed. All remittances to the Bureau shall be made payable to the Bureau of Land Management; those to the Geological Survey shall be made payable to the United States Geological Survey.

Sec. 9. *Bond.* (a) The Lessee shall file with the appropriate Bureau office and maintain a bond in the amount of $20,000 for the purpose of ensuring compliance with the provisions of this lease, except these provisions for compliance with which a separate bond is required under subsection (b) of this section.

(b)(1) Upon approval of a detailed development plan under section 10 of this lease, the Lessee shall file with the appropriate Bureau office and maintain, in addition to the bond required under subsection (a) of this section, a bond (in an amount determined pursuant to paragraph (2) of this subsection) which shall be conditioned upon the faithful compliance with the regulations in 30 CFR Part 231 and 43 CFR Part 23, the provisions of sections 10 and 11 of this lease, the Oil Shale Lease Environmental Stipulations attached to this lease pursuant to section 11, and any approved development plan (or approved, amended, supplemental or partial plan), to the extent that it relates to the preservation and protection and conservation of resources other than Oil Shale

during the conduct of exploration or mining operations, and the reclamation of lands and waters affected by exploration or mining operations.

(2) During the first three Lease Years after the approval of a detailed development plan under section 10 of this lease, the bond shall be in an amount equal to (i) $2,000 per acre for all portions of the Leased Lands which, pursuant to the plan, will be used for spent shale disposal sites and sites for actual mining operations during that three year period and (ii) $500 per acre for all other portions of the Leased Lands upon which operations will be conducted or which will be directly affected by operations during that three year period under the plan, but the total bond shall in no event be less than $20,000. After the first three Lease Years the bond shall be renewed at intervals of three Lease Years. Each renewed bond shall be for three Lease Years and at such a total figure as shall be determined by the Lessor to be needed to provide for the reclamation and restoration of all portions of the Leased Lands which have been affected by previous operations under this lease or which will be affected by operations under this lease during the ensuing three year period. The amount of the bond shall be increased at any time during the three-year period at the demand of the Lessor if there is a change in the development plan which, in the opinion of the Lessor, increases the possibility of environmental damage. Upon request of the Lessee, the bond may be released as to all or any portion of the Leased Lands affected by exploration or mining operations during the three year period covered by the bond when the Lessor has determined that the Lessee has successfully met the reclamation requirements of the approved development plan and that operations have been carried out and completed with respect to these lands in accordance with the approved plan.

(c) Prior to the approval of any plan for exploratory work under section 10(d) of this lease, the Lessee shall file with the appropriate Bureau office and maintain, in addition to the bond required under subsection (a) of this section, a bond in such an amount as the Mining Supervisor shall require, but in no event less than $20,000, which shall be conditioned upon the faithful compliance with regulations in 30 CFR Part 231 and 43 CFR Part 23, the provisions of sections 10 and 11 of this lease, the Oil Shale Lease Environmental Stipulations attached to this lease pursuant to section 11, and any approved plan for exploratory work, to the extent that it relates to the preservation and protection of the environment (including land, water, and air), the protection and conservation of resources other than Oil Shale during the conduct of exploration operations, and the reclamation of lands and waters affected by exploration operations.

The bond required by this subsection shall apply only to actions taken prior to the date of approval of the development plan under section 10(a) of this lease. However, with the consent of the Mining Supervisor, the Lessee may modify this bond in such a manner as is necessary to meet the requirements of subsection (b) of this section, and the bond so modified may, with the consent of the Mining Supervisor, be maintained as the bond required under subsection (b).

Sec. 10. *Development plan and diligence requirements.* (a) The Lessee shall file with the Mining Supervisor on or before the third Anniversary Date a detailed development plan. This plan shall include: (1) a schedule of the planning, exploratory, development, production, processing, and reclamation operations and all other activities to be conducted under this lease; (2) a detailed description pursuant to 30 CFR Part 231 and 43 CFR Part 23 of the procedures to be followed to assure that the development plan, and lease operations thereunder, will meet and conform to the environmental criteria and controls incorporated in the lease; and (3) a requirement that the Lessee use all due diligence in the orderly development of the Leased Deposits, and, in particular, to attain, at as early a time as is consistent with compliance with all the provisions of this lease, production at a rate at least equal to the rate on which minimum royalty is computed under section 7(e)(1).

Prior to commencing any of the operations under the development plan in the Leased Lands, the Lessee shall obtain the Mining Supervisor's approval of the development plan. The Mining Supervisor shall not delay unnecessarily in the consideration of a development plan, but he shall take time to consider both technical and environmental provisions of the plan thoroughly prior to approval, and shall hold public hearings on the environmental provisions to assist him in his consideration of the detailed development plan. If the development plan submitted by the Lessee is unacceptable, the Mining Supervisor shall inform the Lessee by written notice of the reasons why the development plan is unacceptable and shall give him an opportunity to amend the plan. If an acceptable development plan is not submitted to the Mining Supervisor by the Lessee within one year after the Lessee's receipt of that notice, the Mining Supervisor shall send a second written notice to the Lessee concerning the unacceptability of the development plan. A failure by the Lessee to submit an acceptable plan within one year after his receipt of the second written notice, without reasonable justification for delay, shall be grounds for termination of the lease, if the Lessor so elects.

Upon approval of the plan, the Lessee shall proceed to develop the Leased Deposits in accordance with the approved plan. After the date of approval of the development plan, the Lessee shall conduct no activities upon the Leased Lands except pursuant to that development plan, or except for necessary activities following a relinquishment under section 28 of this lease or for the disposition of property after termination pursuant to section 32 of this lease.

(b) The Lessee must obtain the written approval of the Mining Supervisor of any change in the plan approved under subsection (a).

(c) The Lessee shall file with the Mining Supervisor annual progress reports describing the operations conducted under the development plan required under subsection (a).

(d) Prior to undertaking any exploratory work on the Leased Lands between the Effective Date and the date of approval of the detailed development plan required by subsection (a) of this section, the Lessee shall file with the Mining Supervisor a plan showing the exploratory work which he proposes to undertake and he shall not commence that work until the Mining Supervisor has approved the plan.

Exploratory work, as used in this subsection, shall include, but not be limited to, seismic work, drilling, blasting, research operations, cross-country travel, the construction of roads and trails and other necessary facilities, and the accumulation of baseline data required under section 1(C) of the Oil Shale Lease Environmental Stipulations. Prior to approval of the detailed development plan under subsection (a) of this section, all exploratory work on the Leased Lands shall be conducted pursuant to a plan approved under this subsection.

Sec. 11. *Protection of the environment; additional stipulations.* (a) The Lessee shall conduct all operations under this lease in compliance with all applicable Federal, State and local water pollution control, water quality, air pollution control, air quality, noise control, and land reclamation statutes, regulations, and standards.

(b) The Lessee shall avoid, or, where avoidance is impracticable, minimize and, where practicable, repair damage to the environment, including the land, the water and air.

(c) The Oil Shale Lease Environmental Stipulations are attached to and specifically incorporated in this lease. A breach of any term of these stipulations will be a breach of the terms of this lease and subject to all the provision of this lease with respect to remedies in case of default.

Sec. 12. *Operations on the Leased Lands; Water Rights.* (a) The Lessee shall exercise reasonable diligence, skill, and care in all operations on the Leased Lands. The Lessee's obligations shall include, but not be limited to, the following:

(1) The Lessee shall conduct all operations on the Leased Lands so as to prevent injury to life, health, or property.

(2) The Lessee shall avoid, or, where avoidance is impracticable, minimize and, where practicable, correct hazards to the public health and safety related to his operations on the Leased Lands.

(3) The Lessee shall avoid wasting the mineral deposits, and other resources, including but not limited to, surface resources, which may be found in, upon, or under such lands.

(b) The Lessee shall conduct all operations on the Leased Lands whether they are surface or underground mining operations, and whether they are in lands in which the Lessor owns the surface or those in which the Lessor has disposed of the surface, in accordance with the provisions of 30 CFR Part 231 and 43 CFR Part 23. Both 30 CFR Part 231 and 43 CFR Part 23 are specifically incorporated by reference into the provisions of this section. The provisions of 43 CFR Part 23 are hereby expressly made applicable to the Lessee's underground mining operations with equal force and effect to that given to those provisions in their application to surface mining operations and to operations on lands in which the Lessor owns the surface.

(c) The Lessee shall take such reasonable steps, and shall conduct operations in such a manner, as may be needed to avoid or, where avoidance is impracticable, to minimize and, where practicable, repair damage to: (1) any forage and timber growth on Federal or non-Federal lands in the vicinity of the Leased Lands; (2) crops, including forage, timber, or improvements of a surface owner; or (3) improvements, whether owned by the United States or by its permittees, licensees, or lessees. The Lessor must approve the steps to be taken and the restoration to be made in the event of the occurrence of damage described in this subsection.

(d) All water rights developed by the Lessee through operations on the Leased Lands shall immediately become the property of the Lessor. As long as the lease continues, the Lessee shall have the right to use those water rights free of charge for activities under the lease.

Sec. 13. *Development by in situ methods.* Where *in situ* methods are used for development of Oil Shale, the Lessee shall not place any entry, well, or opening for such operations within 500 feet of the boundary line of the Leased Lands without the permission of, or unless directed by, the Mining Supervisor,

nor shall induced fracturing extend to less than 100 feet from that boundary line.

Sec. 14. *Nuclear fracturing.* No nuclear explosive may be detonated on or in the Leased Lands without the express written approval of the Secretary. The Secretary may approve the detonations of such explosives only after the preparation of an environmental impact statement pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. § 4332(2)(C)).

Sec. 15. *Inspection and investigation.* The Lessee shall permit any duly authorized officer or representative of the Department at any reasonable time:

(a) to inspect or investigate the Leased Lands and all surface and underground improvements, works, machinery, and equipment, and all books and records pertaining to operations and surveys or investigations under this lease; and

(b) to copy and make extracts from any books and records pertaining to operations under this lease.

Sec. 16. *Reports, maps, etc.* (a) At such times and in such a form as the Lessor may prescribe, the Lessee shall furnish a report with respect to investment and operating costs under this lease. The Lessee shall also submit to the Lessor in such form as the latter may prescribe, not more than 60 days after the end of each quarter of the Lease Year, a report covering that quarter which shall show the amount of each respective mineral or product produced from the Leased Deposits by each method of production used during the quarter, the character and quality thereof, the amount of products and by-products disposed of and price received therefor, and the amount in storage or held for sale. This report shall be certified by the superintendent of the mine, or by some other agency having personal knowledge of the facts who has been designated by the Lessee for that purpose.

(b) The Lessee shall prepare and furnish at such times and in such form as the Lessor may prescribe, maps, photographs, reports, statements and other documents, required by the provisions of 30 CFR Part 231 and 43 CFR Part 23.

Sec. 17. *Notice.* Any notice which is required under this lease shall be given in writing. Where immediate action is required, notice may be given orally or by telegram, but, where this is done, the oral notice shall be confirmed in writing. Wherever this lease requires the Lessee to give notice, notice shall be given to the Mining Supervisor unless this lease requires that notice be given to another officer. The Lessee shall inform the Bureau State Office and the Mining Supervisor of the Lessee's officer to whom notice shall be given.

Sec. 18. *Employment practices.* The Lessee shall pay all wages due persons employed on the Leased Lands at least twice each month in lawful money of the United States. The Lessee shall grant all miners and other employees complete freedom of purchase. The Lessee shall restrict the workday to not more than 8 hours in any one day for underground workers, except in cases of emergency. The Lessee shall employ no person under the age of 16 years in any mine below the surface. If the laws of the State in which the mine is situated prohibit the employment, in a mine below the surface, of persons of an age greater than 16 years, the Lessee shall comply with those laws.

Sec. 19. *Equal Opportunity Clause; certification of non-segregated facilities.* (a) *Equal Opportunity Clause.* During the performance of this lease the Lessee agrees as follows:

(1) The Lessee shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee shall take affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee shall, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Lessee shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations and relevant orders of the Secretary of Labor.

(5) The Lessee shall furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Secretary of the Interior and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of the said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee shall include the provisions of paragraphs (1) through (7) of this subsection (a) in every contract, subcontract, or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor or vendor. The Lessee shall take such action with respect to any contract, subcontract or purchase order as the Secretary may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however,* That in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor or vendor as a result of such direction by the Secretary, the lessee may request the lessor to enter into such litigation to protect the interests of the lessor.

(b) *Certification of non-segregated facilities.* By entering into this lease, the Lessee certifies that Lessee does not and shall not maintain or provide for Lessee's employees any segregated facilities at any of Lessee's establishments, and that Lessee does not and shall not permit Lessee's employees to perform their services at any location, under Lessee's control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause in this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. Lessee further agrees that (except where Lessee has obtained identical certifications from proposed contractors and subcontractors for specific time periods) Lessee shall obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that Lessee shall retain such certifications in Lessee's files and shall make them available to the Secretary at his request; and that Lessee shall forward the following notice to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods): Notice to prospective contractors and subcontractors of requirements for certification of non-segregated facilities. A Certification of Non-segregated Facilities, as required by the May 9, 1967, order (32 FR 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semi-annually, or annually).

Sec. 20. *Taxes.* The Lessee shall pay, when due, all taxes lawfully assessed and levied under the laws of the State or the United States upon improvements, output of mines, or other rights, property, or assets of the Lessee.

Sec. 21. *Monopoly and fair prices.* The Lessor reserves full authority to promulgate and enforce orders and regulations under the provisions of sections 30 and 32 of the Act (30 U.S.C. §§ 187 and 189) necessary to insure that any sale of the production from the Leased Deposits to the United States or to the public is at reasonable prices, to prevent monopoly, and to safeguard the public welfare, and such regulations shall, upon promulgation, be binding upon the Lessee.

Sec. 22. *Suspension of operations or production.* Any suspension of operations or production under section 39 of the Act (30 U.S.C. § 209) granted with respect to this lease shall take effect as of the first day of the calendar month following the calendar month during which the suspension is approved, except that, in a situation where in the opinion of the Mining Supervisor there is an immediate danger to life, or of irreparable major damage to property or the environment, the Mining Supervisor may grant a suspension effective immediately. The term of any suspension granted pursuant to the Lessee's request with respect to operations or production under this lease shall be in full calendar months. A suspension shall terminate either at the time designated in the suspension order or, if there is no time of

termination in the order, at such time as the Mining Supervisor shall designate in subsequent notice to the Lessee.

Sec. 23. *Readjustment of terms and conditions.* The Lessor may propose the reasonable readjustment of the terms and conditions of this lease (including royalty provisions), the first readjustment to be effective at the twentieth Anniversary Date of this lease and subsequent readjustments to be effective at twenty Lease Year intervals thereafter. At least 120 days before the appropriate Anniversary Date the Lessor shall give notice to the Lessee of any proposed readjustment of the terms and conditions of the lease and the nature thereof, and, unless the Lessee, within 60 days after receipt of such notice, files with the Lessor an objection to the proposed terms or relinquishes the lease as of the appropriate Anniversary Date, the Lessee shall be deemed conclusively to have agreed to such terms and conditions. If the Lessee files objections with the Lessor, and agreement cannot be reached between the Lessor and the Lessee within a period of 60 days after the filing of the objections, the lease may be terminated by either party upon giving 60 days' notice to the other party; however, the Lessor's right to terminate the lease shall be suspended by the Lessee's filing of a notice of appeal pursuant to section 34 of this lease. If the Lessee files objections to the proposed readjusted terms and conditions, the existing terms and conditions (other than those concerning royalties) shall remain in effect until there has been an agreement between the Lessor and the Lessee on the new terms and conditions to be incorporated in the lease, or until the Lessee has exhausted his rights of appeal under section 34 of this lease, or until the lease is terminated; however, the readjusted royalty provisions shall not be effective until there is either agreement between the Lessor and the Lessee or until the lease is terminated. If the readjusted royalty provisions are subsequently rescinded or amended, the Lessee shall be permitted to credit any excess royalty payments against royalties subsequently due to the Lessor.

Sec. 24. *Assignment.* With respect to the assignment or transfer of an interest under this lease, the Lessee shall comply with the provisions of 43 CFR Subpart 3506 to the same extent as if that Subpart were specifically applicable to oil shale leases. The Lessor shall have no discretion to refuse to approve an assignment except: (1) where the assignee is not qualified to hold a lease under section 1 of the Act (30 U.S.C. § 181); (2) where the assignee is unable to provide an adequate bond; or (3) where either the assigned or the retained portion of the lease would, in the opinion of the Lessor, be too small to be economically developed.

Sec. 25. *Overriding royalties.* The Lessee shall not create, by assignment or otherwise, an overriding royalty interest in excess of 25 percent of the rate of royalty payable to the United States under this lease or an overriding royalty interest which when added to any other outstanding overriding royalty interest exceeds that percentage, except that, where an interest in the leasehold or in an operating agreement is assigned, the assignor may retain an overriding royalty interest in excess of the above limitation if he shows to the satisfaction of the Department that he has made substantial investments for improvements on the lands covered by the assignment.

Sec. 26. *Heirs and successors in interest.* Each obligation hereunder shall extend to and be binding upon, and every benefit shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 27. *Unlawful interest.* No member of, or Delegate to, Congress or Resident Commissioner, after his election or appointment, either before or after he has qualified and during his continuance in office, and no officer, agent, or employee of the Department of the Interior, except as provided in 43 CFR 7.4(a)(1), shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Section 3741 of the Revised Statutes of the United States (41 U.S.C. § 22), as amended, and sections 431, 432, and 433, Title 18 of the United States Code, relating to contracts, enter into and form a part of this lease so far as the same may be applicable.

Sec. 28. *Relinquishment of lease.* (a) Upon showing to the satisfaction of the Lessor that he has complied with the terms and conditions of this lease, the Lessee may relinquish the entire lease or any legal subdivision of the Leased Lands.

(b) A relinquishment must be filed, in duplicate, in the proper Bureau State Office. Upon its acceptance it shall be effective as of the date it is filed, subject to the continued obligation of the lessee and his surety, in accordance with the terms and conditions of this lease, (1) to make payment of all accrued bonus payments, rentals, and royalties, except as provided in section 5; (2) to provide for the preservation of any mines, *in situ* production works, underground development works, other permanent improvements, and other property, whether fixtures or personalty, on the Leased Lands; (3) to provide for the reclamation of lands and water affected by exploration or mining operations under this lease; and (4) to comply with all other applicable requirements of this lease.

Sec. 29. *Remedies in case of default.* If the Lessee shall fail to comply with any of the terms and conditions of this lease (including the terms and conditions of any development plan approved under section 10) and that default shall continue for a period of 30 days after service of notice thereof by the Lessor, the Lessor may (1) suspend operations until the required action is taken to correct noncompliance, or (2) institute appropriate proceedings in a court of competent jurisdiction for the forfeiture and cancellation of this lease as provided in section 31 of the Act (30 U.S.C. § 188) and for forfeiture of any applicable bond. If the Lessee fails to take prompt and necessary steps to prevent loss or damage to the mine, property, or premises, or to prevent danger to the employees, or to avoid, or, where avoidance is impracticable, to minimize and, where practicable, repair damage to the environment, or, if immediate action by the Lessor, without waiting for action by the Lessee, is required for any of those purposes, the Lessor may enter on the premises and take such measures as he may deem necessary to prevent such loss, damage, or danger, or to correct the damaging, dangerous, or unsafe condition of the mine or any other facilities upon the Leased Lands, and those measures shall be at the expense of the Lessee.

Sec. 30. *Effect of waiver.* A waiver of any breach of the provisions of this lease shall extend only to that particular breach and shall not limit the rights of the parties with respect to any future breach. A waiver of a particular cause of forfeiture shall not prevent cancellation of this lease for any other cause, or for the same cause occurring at another time.

Sec. 31. *Delivery of premises in case of forfeiture.* In case of the termination of this lease in any manner the Lessee shall deliver to the Lessor, in the condition required by the reclamation requirements of approved exploration and development plans, and subject to the provisions of section 32 of this lease, the Leased Lands, including permanent improvements and other property on the Leased Lands, whether affixed to the ground or movable, and all underground shafts and timbering, well casing, and such other supports and structures as are necessary for the preservation of the Leased Lands, or any mines, other underground development works, or deposits in the Leased Lands.

Sec. 32. *Disposition of property upon termination of lease.* (a) Upon termination of this lease in any manner all underground timbering and any other supports or structures which the Lessor shall inform the Lessee are necessary for the preservation of any mines or other underground development works shall become and remain thereafter a part of the realty without the payment of any compensation to the Lessee. All other structures, equipment, machinery, tools, appliances, and materials on the Leased Lands, whether affixed to the ground or movable, shall remain the property of the Lessee upon the termination of this lease, but the Lessee shall have no right, for a period of six months following the termination, to remove from the Leased Lands any of that property which in the opinion of the Lessor is useful for the protection of the Leased Lands (including any mines in those lands) unless the Lessor shall expressly authorize the removal. During the six-month period the Lessor shall have the right to purchase at the appraised value any or all items of that property required or useful for the protection of the Leased Lands. The appraised value shall be fixed by three disinterested and competent persons (one to be designated by the Lessor, one by the Lessee, and the third by the two so designated), and the appraised value determined by the three or a majority of them shall be conclusive.

(b) At any time within a period of 90 days after either the Lessor has informed the Lessee that he will not purchase the property or the expiration of the 6-month period, the Lessee shall have the right to remove from the premises the property which was not purchased by the Lessor.

(c) Any structures, machinery, equipment, tools, appliances, and materials, subject to removal by the Lessee as provided above, which are allowed to remain on the Leased Lands shall become the property of the Lessor on expiration of the 90-day period or any extension of that period which may be granted by the Lessor because of adverse climatic conditions or other good and sufficient reason, unless the Lessor shall direct the Lessee to remove any or all of such property on expiration of the 90-day period. If the Lessor directs the Lessee to remove such property, the Lessee shall do so at his own expense or, if he fails to do so within a reasonable period, the Lessor may do so at the Lessee's expense.

Sec. 33. *Protection of proprietary information.* (a) This lease, and any activities thereunder, shall not be construed to grant a license, permit or other right of use or ownership to the Lessor, or any other person, of the patented processes, trade secrets, or other confidential or privileged technical information (hereafter in this section called "technical processes") of the Lessee or any other party whose technical processes are embodied in improvements on the Leased Lands or used in connection with the lease. Notwithstanding any other provision of this lease, the Lessor agrees that any technical processes obtained from the Lessee which are designated by the Lessee as confidential shall: (1) not be disclosed to persons other than

employees of the Federal Government having a need for such disclosures; (2) not be copied or reproduced in any manner except as required specifically by the Mining Supervisor; and (3) not be used in any manner that will violate their proprietary nature unless the Mining Supervisor shall make a written determination that such technical processes do not contain trade secrets or are not confidential, or unless such disclosure is required by statute; provided however, that before any such publication or disclosure, except where the overriding national interest demands otherwise, the Mining Supervisor shall notify the Lessee of the proposed disclosure and those to whom the disclosure will be made, provide a copy of the written determination, and allow the Lessee 30 days to submit additional material supporting its claim of confidentiality or otherwise to initiate an appeal from the decision of the Mining Supervisor prior to any disclosure.

(b) In the event the lease is terminated and the Lessor elects pursuant to section 32 to purchase machinery or equipment the use of which would involve technical processes in the operations of the purchased machinery, the Lessor shall have the right to use those technical processes in the operations of the purchased machinery or equipment; provided that (1), with respect to third parties' technical processes which the Lessee has obtained the right to use by contract or agreement, the Lessor shall replace the Lessee as a party to the contract or agreement, and (2) with respect to technical processes owned, developed or controlled by the Lessee itself, the Lessor shall agree to pay the Lessee fair market value for use of the Lessee's technical processes in said operations. Any contract or agreement into which the Lessee shall enter with a third party for the right to use technical processes belonging to that third party shall provide that the Lessor may become a party to that contract or agreement to the extent that those processes may be used for the protection of the Leased Lands. If the Lessee and the Lessor shall not agree as to the fair market value of the Lessee's technical processes, that value shall be determined as provided in section 32(a) for other property acquired by the Lessor upon termination of the lease.

Sec. 34. *Lessee's liability to the Lessor.* (a) The Lessee shall be liable to the United States for any damage suffered by the United States in any way arising from or connected with Lessee's activities and operations conducted pursuant to this lease, except where damage is caused by employees of the United States acting within the scope of their authority.

(b) The Lessee shall indemnify and hold harmless the United States from any and all claims arising from or connected with Lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the Lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damage occurred.

Sec. 35. *Appeals.* The Lessee shall have the right of appeal (a) under 43 CFR 3000.4 from any action or decision of any official of the Bureau, (b) under 30 CFR 231.74 from any action, order, or decision of any official of the Geological Survey, or (c) under applicable regulation from any action or decision of any other official of the Department, arising in connection with this lease, including any action or decision pursuant to section 23 of this lease with respect to the readjustment of terms and conditions.

Sec. 36. *Interpretation of this lease.* (a) The paragraph headings in this lease are for convenience only, and do not purport to, and shall not be deemed to, define, limit, or extend the scope or intent of the paragraph to which they pertain.

(b) As used in this lease, unless the context clearly indicates otherwise, a word in the masculine or neuter form shall be interpreted as equally applicable to the masculine, feminine, and neuter genders, and words in singular form shall be interpreted as equally applicable to singular and plural numbers.

THE UNITED STATES OF AMERICA
By _____
_____
(Title)
Witnesses to Signature of Lessee(s) _____
(Date)
_____ _____
(Signature of Lessee)
_____ _____
(Signature of Lessee)
_____ _____
(Signature of Lessee)

Oil Shale Lease Environmental Stipulations

Section 1. *General.* (A) *Applicability of Stipulations.* The terms, conditions, requirements and prohibitions imposed upon Lessee by these Stipulations are also imposed upon Lessee's agents, employees, contractors, and sub-contractors, and their employees. Failure or refusal of Lessee's agents, employees, contractors, sub-contractors, or their employees to comply with these Stipulations shall be deemed to be the failure or refusal of the Lessee. Lessee shall require its agents, contractors, and sub-contractors to include these Stipulations in all contracts and subcontracts which are entered into by any of them, together with a provision that the other contracting party, and its agents, employees, contractors and sub-contractors, and the employees of each of them, shall likewise be bound to comply with these stipulations.

(B) *Changes in Conditions.* These Stipulations are based on existing knowledge and technology. They may be revised or amended by mutual consent of the Mining Supervisor, the Bureau District Manager, and the Lessee at any time to adjust to changed conditions or to correct an oversight. The Lessor may amend these stipulations at any time without the consent of the Lessee in order to make these stipulations consistent with any new Federal or State statutes for the protection of the environment upon their enactment and with regulations issued under those statutes. The Lessee, the Mining Supervisor, and the Bureau District Manager shall meet at least once a year to review advances in technology and, in a mutual endeavor, weigh, and decide the feasibility and need of revising or amending existing Stipulations.

The Lessor and the Lessee agree that, in this mutual endeavor to decide upon the feasibility and need for amending the existing Stipulations, they will act in good faith and in a sincere effort to make the Lessee's activities under the lease as free from environmental damage as is practicable. Toward this end, systems which require pollution control devices shall possess sufficient flexibility to adopt improved technology at practicable intervals and shall be constructed with the understanding that continued compliance with changing pollution control laws is required.

(C) *Collection of Environmental Data and Monitoring Program.* (1) The Lessee shall compile data to determine the conditions existing prior to any development operations under the lease and shall, except as provided below, conduct a monitoring program before, during, and subsequent to development operations. The Lessee shall conduct the monitoring program to provide a record of changes from conditions existing prior to development operations, as established by the collection of baseline data, a continuing check on compliance with the provisions of the lease (including these attached Stipulations) and all applicable Federal, State, and local environmental protection and pollution control requirements, timely notice of detrimental effects and conditions requiring correction, and a factual basis for revision or amendment of these Stipulations pursuant to Section 1(B) hereof. Both the types of baseline and subsequent data required and the methods to be used for the collection of the baseline data and the conduct of the monitoring program shall be those set forth in paragraph (2) of this subsection. Once the monitoring program has begun the baseline data shall be collected continuously as long as the Mining Supervisor shall require under paragraph (2) of this subsection. The baseline data shall be conducted for at least one full year prior to the submission of the detailed development plan under section 10(a) of this lease. The plan shall, at the discretion, or with the approval, of the Mining Supervisor, be modified at any time as necessary as a result of study of the baseline data obtained after the submission of the plan. Exploratory operations, as approved by the Mining Supervisor, shall be permitted during the collection of the baseline data. All records of baseline data and subsequent monitoring required by this subsection shall be submitted to the Mining Supervisor, at intervals to be prescribed by him.

(2) In collecting baseline data and conducting a monitoring program the Lessee shall adopt the following methods and shall collect the information required below. Wherever the number and placing of testing installations are not given, they shall be as determined by the Lessee, but subject to being changed as required by the Mining Supervisor. The monitoring program shall, thereafter, be conducted until the Mining Supervisor has determined to his satisfaction that environmental conditions have been established after the termination of development operations which are consistent with the requirements of applicable Federal and State statutes and regulations; however, the Mining Supervisor may terminate this requirement at an earlier date where it is in the public interest.

(a) *Surface water.* The Lessee shall construct gauging stations on the major drainages on the Leased Lands and, as required by the Mining Supervisor, upstream and downstream from the Leased Lands. Data collected at the stations shall include continuous streamflow records, continuous water temperature records, periodic analyses for selected inorganic and organic chemical constituents, as directed by the Mining Supervisor, continuous precipitation records, and continuous sediment records. The Lessee shall maintain records of all information obtained under this paragraph (2)(a).

(b) *Ground water.* At each proposed or actual mine site, the Lessee shall drill a test well and shall install an observation well in each water-bearing zone defined by the test well. The Lessee shall collect samples of drill cuttings and shall make borehole geophysical logs as directed by the Mining Supervisor. The lessee shall isolate each water-bearing zone penetrated by the test wells and pump each of the zones for the period required by the Mining Supervisor. During pump tests the Lessee shall record the water-level fluctuations in each of the observation wells, maintain steady, continuous discharge

from the test well, and record the discharge measurements. The Lessee shall maintain records of water level and temperature on each test well and on each observation well pursuant to a measurement schedule specified by the Mining Supervisor. At the initial pump test of each well the Lessee shall determine the water quality of that well by analyzing water samples for organic and inorganic chemical constituents, including, without limitation, trace constituents subject to drinking water standards and water pollution control regulations. The Mining Supervisor may require analysis of samples for such additional constituents as he may deem desirable. After the initial test, the Lessee shall collect water samples from each well at six-month intervals and analyze them for evidence of trends in water quality as determined by comparing the samples with previous analyses.

The Lessee shall complete one observation well upgradient from each spent shale disposal site and at least two observation wells downgradient from the site at depths and locations specified by the Mining Supervisor. The Mining Supervisor may require additional observation wells if there is evidence that they are needed to provide adequate monitoring of the water quality of an aquifer. The Lessee shall record water levels and temperatures in each observation well pursuant to a measurement schedule established by the Mining Supervisor. The Lessee shall determine the water quality of each observation well by analyzing samples for organic and inorganic chemical constituents, including, without limitation, trace constituents subject to drinking water standards and water pollution controls. The Mining Supervisor may require analysis of samples for such additional constituents as he may deem desirable. After the initial test of an observation well the Lessee shall collect water samples from the well at six-month intervals and analyze them for evidence of trends in water quality as determined by comparing the samples with previous analyses.

The Lessee shall maintain records of all information obtained under this paragraph (2)(b).

(c) *Air Quality.* In the collection of baseline data, the Lessee shall monitor air quality over at least 90 percent of each lease year, during which monitoring is required, using four strategically-located stations. One of the stations shall be at the expected point of maximum concentrations, or as close to that expected point of maximum concentration as feasible.

The Lessee shall monitor air quality for sulphur dioxide, hydrogen sulphide, and suspended particulates, using automatic instruments with continuous recorders, when applicable. The Lessee shall also monitor, under the same conditions, hydrocarbons, oxides of nitrogen, and other pollutants, where the Mining Supervisor has determined that such monitoring is necessary to determine baseline air quality or to conduct an effective monitoring program. In addition, the Lessee shall establish a meteorological station in reasonable proximity to each proposed plant site to monitor, at least 95 percent of the time over each lease year during which monitoring is required, wind direction and speed (vane and anemometer) and humidity at three levels, one at least 100 feet above the surface of the plant site, one at approximately 30 feet above the surface of the plant site, and one at ground level, and temperature at two levels, one at least 100 feet above the surface of the plant site, and one at approximately 30 feet above the surface of the plant site. The Lessee shall maintain records of all baseline data collection and monitoring programs.

(d) *Flora and Fauna.* The Lessee shall make studies of the flora and fauna of the leased lands and of all other lands lying within a mile of the leased lands, and of all lands to be used for disposal of residues from mining and processing oil shale and also of the aquatic habitat as far downstream as the Mining Supervisor shall require. These studies will determine the distribution and density of the flora in these areas and periodically determine the condition of such flora. These studies shall also determine the species of fauna, their distribution, and their abundance at bi-monthly intervals. The Lessee shall submit a report to the Mining Supervisor of the baseline data obtained and, during the monitoring program, shall submit semi-annual reports to the Mining Supervisor showing whether or not there has been any change. The Lessee shall also study, and report to the Mining Supervisor on ecological interrelationships including migratory patterns of birds, mammals, and fish, and plant animal relationships. The Lessee shall compile an inventory of natural surface water features, such as springs and seeps.

(e) *Soil Survey and Productivity Assessment.* The Lessee shall conduct a soil survey and productivity assessment of all portions of the Leased Lands proposed to be disturbed under the detailed development plan. This survey must include the preparation of maps, tables, and reports describing soil types, depth of the various layers of soil, but not more than a depth of 50 feet from the surface to be disturbed, strike and dip of the material, slopes, solar exposure, vegetative cover, and erodability.

(3) The environmental monitoring program shall be an integral part of the detailed development plan required in Section 10 of the lease, and at the time of the submission of the plan the Lessee shall provide the Mining Supervisory with a complete compilation of the baseline data collected above and the record of the monitoring program for any period subsequent to the conclusion of that compilation.

(4) Not more than one year after obtaining approval of the detailed mining plan and on each subsequent anniversary date the Lessee shall submit to the Mining Supervisor a report of the baseline data collected and a report of the monitoring programs as a part of the required annual progress reports on the development program. This portion of the annual report will be subject to public review and comment.

(D) *Emergency Decisions.* Any decisions or approvals of the Mining Supervisor required by these Stipulations to be in writing may in emergencies be issued orally, with written confirmation as soon thereafter as possible.

(E) *Environmental Briefing.* During the life of this Lease, Lessee shall provide that such Federal and State employees as may be designated by the Mining Supervisor shall brief personnel on environmental and other pertinent matters. The Lessee shall provide for such briefings upon the request of the Mining Supervisor, but the Mining Supervisor shall request only such briefings as may be reasonably necessary to effectuate the provisions of this Lease. Lessee shall make arrangements for the time, place, and attendance at such briefings. Lessee shall bear all costs of such briefings other than salary, per diem, subsistence and travel costs of Federal and State employees.

(F) *Construction Standards.* The general design of all buildings and structures shall comply with the latest edition of the Uniform Building Code (U.B.C.). Structural steel shall be designed in accordance with the latest edition of the American Institute of Steel Construction "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings." Reinforced concrete shall comply with the latest edition of the American Concrete Institute's Building Code Requirements for Reinforced Concrete." Engineering works for impoundments shall conform to standard engineering practice sufficient to withstand the 100-year flood in the drainage in which installed.

(G) *Housing and Welfare of Employees.* In the exercise of his right under section 2 of the Lease to construct buildings and other facilities for the housing and welfare of his employees, the Lessee shall at all times make certain that these facilities are situated, constructed, operated, and maintained in an orderly manner, satisfactory to the Mining Supervisor. While no general restriction is imposed upon the construction of facilities necessary to the employees' health and well-being, such construction shall be subject to the Mining Supervisor's approval and shall not unreasonably damage the environment of the leased lands.

(H) *Posting of Stipulations and Plans.* The Lessee shall insure that copies of these Stipulations and any approved exploration and development plans are available at the operating sites and for inspection by all on-the-ground operating personnel.

Sec. 2. *Access and Service Plans.* (A) *Transportation Corridor Plans.* The Lessee shall provide corridor plans for roads, pipelines and utilities on the Leased Lands for approval by the Mining Supervisor. Each plan shall include probable major design features and plans for the protection of the environment, prevention of pollution, minimization of erosion, rehabilitation and revegetation of all disturbed areas not required in operation of the transportation system, both during and after construction. The Lessee shall, to the maximum extent practicable, make use of multi-use corridors for roads, pipelines and utilities.

(B) *Regulation of Public Access.* After road construction is completed, the Lessee shall, upon consultation with the Lessor, permit reasonable, free and unrestricted public access to and upon the road and rights-of-way for all lawful and proper purposes except in plant sites, mine sites, disposal areas, and other operational areas which may be closed to the general public. The Lessee shall regulate public access and public vehicular traffic as required to facilitate operations and to protect the public and, to the extent reasonable, livestock and wildlife from hazards associated with construction. For this purpose the Lessee shall provide warnings, flagmen, barricades, and other safety measures as necessary. Whenever the Mining Supervisor shall determine that the Lessee's regulation of access and traffic is unreasonable, or that the Lessee's provision of safety measures is inadequate, he shall so inform the Lessee who shall immediately take corrective measures.

(C) *Existing and Planned Roads and Trails.* Where feasible, the Lessee shall use existing roads and trails. Unless the Mining Supervisor shall direct otherwise, roads and trails shall be located, constructed, maintained, and closed according to the specifications of the Bureau of Land Management and shall include drainage structures where needed.

(D) *Waterbars and Breaks.* The Lessee shall divert runoff from roads and uphill slopes by means of waterbars, waterbreaks, or culverts constructed in accordance with Bureau specifications.

(E) *Pipeline Construction Standards.* In the design and construction of oil pipelines and the choice of materials for them, the Lessee shall follow the standards (wherever they may be made applicable) established by the Department of Transportation and,

if these standards should ever be revised, supplemented, or superseded, shall follow the new standards in new construction. These standards include:

(1) 49 CFR 192, Transportation of Natural and Other Gas by Pipeline; and

(2) 49 CFR 195, Transmission of Liquids by Pipeline.

(F) *Pipeline Safety Standards.* The Lessee shall meet, where applicable, the safety standards and reporting requirements set forth in the following, as now in effect and as hereafter amended, or, if these regulations should be superseded, the regulations or other rules superseding them:

(1) 49 CFR, Part 110, Carriers by Pipeline (Other than Natural Gas and Water);

(2) 49 CFR, Part 192, Transportation of Natural and Other Gas and Water);

(3) 49 CFR, Part 195, Transmission of Liquids by Pipeline;

(G) *Shut-Off Valves.* The Lessee shall insure that oil transportation pipeline designs provide for automatic shut-off valves at each pumping or compressor station and such additional valves as may be necessary in view of:

(1) Terrain and drainage systems traversed;

(2) Population centers;

(3) Wildlife and fishery habitat;

(4) Public water supplies and significant water bodies;

(5) Hazardous geologic areas; and

(6) Scenic Values.

The Lessee shall install any additional valves required by the Mining Supervisor.

(H) *Pipeline Corrosion.* With regard to oil transportation pipelines, the Lessee shall submit detailed plans to the Mining Supervisor for corrosion-resistant design and methods for early detection of pipeline corrosion. These shall include: (1) pipe material and welding techniques to be used and information on their particular suitability for the environment involved; (2) details on the external pipe protection to be provided (coating, wrapping, etc.), including information on variation of the coating process to cope with variations in environmental factors; (3) plans for cathodic protection including details of impressed ground sources and controls to insure continuous maintenance of adequate protection over the entire surface of the pipe; (4) details of plans for monitoring cathodic protection current including spacing of current monitors; and (5) provision of periodic surveys of trouble spots, regular preventive maintenance surveys, regular surveys for external and internal deterioration which may result in failure, and special provisions for abnormal potential patterns resulting from crossings with other pipelines or cables.

(I) *Electric Transmission Facilities.* The Lessee shall design and construct telegraph, telephone, electric powerlines, distribution lines and other transmission facilities in accordance with the guidelines set forth in "Environmental Criteria for Electric Transmission System" (U.S.D.I., U.S.D.A., 1970), as now or in the future amended, or if these guidelines should be superseded, in the guidelines or other rules superseding them. Distribution lines shall be designed and constructed in accordance with REA Bulletin 61-10 (Powerline Contacts by Eagles and other Large Birds), as now or in the future amended, or, if these guidelines should be superseded, in the guidelines or other rules superseding them.

(J) *Natural Barriers.* Where a road or exploratory site cuts a natural barrier used for livestock control, the Lessee shall, at his own expense, close the opening by the use of a fence or other suitable barrier meeting Bureau standards.

(K) *Specifications for fences, and Cattleguards.* Fences and cattleguards constructed by the Lessee shall meet established Bureau specifications and standards.

(L) *Crossings.* The Lessee shall take all steps necessary to make certain that roads constructed under this lease do not prevent or unreasonably disrupt the use of existing roads, foot trails, pipelines, and other rights-of-way or major animal migration routes. This requirement shall include the construction of suitable overhead or underground crossings where they are determined to be necessary by the Mining Supervisor.

(M) *Alternate Routes.* If during construction the Lessee's activities shall interfere with the free use of existing roads and trails used by persons, whether or not recorded, he shall provide such alternate roads and trails as the Mining Supervisor may determine to be needed.

(N) *Off-Road Vehicle Use.* The Lessee shall use off-road vehicles in a manner consistent with applicable regulations.

Sec. 3. *Fire Prevention and Control.* (A) *Instructions of the Mining Supervisor.* (1) The Lessee shall comply with the instructions and directions of the Mining Supervisor concerning the use, prevention and suppression of fires, and shall make every reasonable effort to prevent, control and suppress any fire on land subject to the lease. Uncontrolled fires must be immediately reported to the Mining Supervisor.

(2) (a) The Lessee shall construct fire lines or perform clearing when determined by the Mining Supervisor to be necessary for forest, brush and grass fire prevention.

(b) The Lessee shall comply with the National Fire Codes on handling, transportation, storage, use and disposal of flammable liquids, gases, and solids.

(c) The Lessee shall take all appropriate actions to prevent oil shale outcrop fires.

(B) *Liability of Lessee.* The control and suppression of any fires on the Leased Lands (or on adjoining public lands which have spread from the Leased Lands) caused by the Lessee or his employees, contractors, subcontractors, or agents shall be at the expense of the Lessee. Upon the failure of the Lessee to control and suppress such fires in a manner satisfactory to him, the Mining Supervisor shall take such steps as are necessary to control and suppress the fire, either alone or in conjunction with other Federal, State, and local authorities, and the cost of such control and suppression shall be borne by the Lessee.

Sec. 4. *Fish and Wildlife.* (A) *Management Plan.* The Lessee shall submit for approval by the Mining Supervisor, as part of the exploration and mining plan, a detailed fish and wildlife management plan which shall include the steps which the Lessee shall take to: (1) avoid or, where avoidance is impracticable, minimize damage to fish and wildlife habitat, including water supplies; (2) restore such habitat in the event it is unavoidably destroyed or damaged; (3) provide alternate habitats; and (4) provide controlled access to the public for the enjoyment of the wildlife resources on such lands as may be mutually agreed upon. The plan shall include, but not be limited to, detailed information on activities, time schedule, performance standards, proposed accomplishments, and ways and means of avoiding or minimizing environmental impacts on fish and wildlife.

(B) *Mitigation of Damage.* Wherever destruction or significant disturbance of fish and wildlife habitat is inevitable, the Lessee shall submit, for the Mining Supervisor's approval at least 60 days prior to the destruction or damage of the habitat, those measures which the Lessee proposes to take to comply with the requirement of 30 CFR 231.4(b), as now in effect or as hereafter amended, or, if that regulation should be superseded, the regulations or other rules superseding it, to avoid, or, where avoidance is impracticable, minimize and repair, injury or destruction of fish and wildlife and their habitat. As a general rule, the proposed measures should provide for habitat of similar type and equal in quantity and quality to that destroyed or damaged. The Mining Supervisor shall, within 60 days after the submission of the proposed measures to him, either approve or disapprove them. If he shall approve them, the Lessee shall execute the proposed measures for the mitigation of the destruction or damage of the habitat. If the Mining Supervisor shall disapprove the measures, he shall offer the Lessee an opportunity for consultation at which, whenever possible, he shall inform the Lessee of any changes which will make the measures acceptable.

(C) *Big Game.* The Lessee shall construct big game drift fences when and where necessary to direct big game movements around or away from oil shale development areas.

(D) *Posting of Notices.* The Lessee shall post in reasonable and conspicuous places notices informing its employees, agents, contractors, subcontractors, and their employees of all applicable laws and regulations governing hunting, fishing, and trapping.

Sec. 5. *Health and Safety.* (A) *In General.* The Lessee shall take all measures necesary to protect the health and safety of all persons affected by it activities and operations and shall immediately abate any activity or condition which threatens the life of any person or which threatens any peron with bodily harm.

(B) *Compliance with Federal Health and Safety Laws and Regulations.* The Lessee shall comply with the Federal Metal and Nonmetallic Mine Safety Act of 1966 (30 U.S.C. §§ 721-740), as now in effect or as hereafter amended, or, if it should be superseded, with the statute superseding it, and the Occupational Health and Safety Act of 1970 (29 U.S.C. §§ 651-678), a now in effect, or as hereafter amended, or, if it should be superseded, with the statute superseding it, and all health and safety standards promulgated pursuant thereto.

(C) *Use of Explosives.* The Lessee shall insure that all blasting operations, including the purchase, handling, transportation, storage, use, and destruction of blasting agents are performed in conformance with Public Law 91-452, October 15, 1970 (18 U.S.C. §§ 841-848), as now in effect or as hereafter amended, or if it should be superseded, with the statute superseding it, and the regulations promulgated thereunder which are now in 26 CFR 181.

Sec. 6. *Historic and Scientific Values.* (A) *Cultural Investigations.* The Lessee shall, prior to construction or mining, conduct a thorough and professional investigation of any portion of the Leased Lands to be used, including, but not limited to, those to be used for mining, processing, or disposal operations or roads, for objects of historic or scientific interest, including, but not limited to, Indian ruins, pictographs and other archeological remains. The Lessee shall report the results of these investigations of the Mining Supervisor before commencing construction and mining operations.

(B) *Objects of Historic or Scientific Interest.* The Lessee shall not in any activities under this lease appropriate, remove, injure, deface, or alter any object of antiquity, or of historic, prehistoric, or scientific interest, including, but not limited to, Indian ruins, pictographs, and other archeological remains. Where a question exists as to whether or not an object is of historic prehistoric or scientific interest or is an object of antiquity, the Lessee shall report to the Mining Supervisor for a final determination of which he shall inform the Lessee without unnecessary delay.

Sec. 7. *Oil and Hazardous Materials.* (A) *Spill Contingency Plans.* The Lessee agrees to submit spill contingency plans to the Mining Supervisor with the detailed development plan. This plan shall provide for the control of spills of oil or other hazardous substances which for purposes of this Section 7 shall be defined in section 311(a)(14) of the Federal Water Pollution Control Act, as amended (86 Stat. 816, 861), as now in effect or as hereafter amended, or if it should be superseded, the statute superseding it.

The plans shall conform to this Stipulation and the National Oil and Hazardous Substances Pollution Contingency Plan, 36 FR 16215, August 20, 1971, as now in force or as hereafter amended, or, if it shall be superseded, the document superseding it, and shall: (1) include a description of positive spill prevention efforts which the lessee shall make; (2) include provisions for spill control; (3) provide for immediate corrective action including spill control and restoration of the affected resource; (4) provide that the Mining Supervisor shall approve any materials or devices used for spill control and shall approve any disposal sites or techniques selected to handle spilled matter; and (5) include separate and specific techniques and schedules for cleanup of spills on land, rivers and streams. As used in this Stipulation, spill control is defined as including detection, location, confinement, and cleanup of the spill.

(B) *Responsibility.* If, during operations, any oil or other hazardous substance should be discharged, the control, removal, disposal, and cleanup of that substance, wherever found, shall be the responsibility of Lessee. Upon the failure of the Lessee to control, remove, dispose of, or clean up the discharge, or to repair all damages resulting therefrom, the Mining Supervisor may take such measures as he deems necessary to control, remove, dispose of, or clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the Lessee. Such action by the Mining Supervisor shall not relieve Lessee of any responsibility as provided in this lease.

(C) *Reporting of Spills and Discharges.* The Lessee shall give immedaite notice of any spills or discharges of oil or other hazardous substances to: (1) the Mining Supervisor and (2) such other Federal and State officials as are required by law to be given such notice. Any oral notice shall be confirmed by the Lessee in writing as soon as possible.

(D) *Storage and Handling.* The Lessee shall store oil, petroleum products, industrial chemicals and similar toxic or volatile materials in durable containers and locate such materials so that any accidental spillage will not drain into water courses, lakes, reservoirs, or ground water. Unless otherwise approved by the Mining Supervisor, the Lessee shall store substantial quantities (more than 500 gallons) of such materials in an area surrounded by impermeable containment structures. The volume of the containment structures shall be at least: (1) one-hundred fifty (150) percent of the total storage volume of storage tanks in the relevant area; plus (2) a volume sufficient for maximum trapped precipitation and run-off which might be impounded at the time of a spill.

(E) *Pesticides and Herbicides.* The Lessee shall not use pesticides and herbicides without the approval of the Mining Supervisor. Pesticides and herbicides shall be considered treatments of last resort, to be used only when reasonable alternatives are not available and where their use is consistent with protection and enhancement of the environment. Where pesticides and herbicides are used, they shall be used only with the approval of the Mining Supervisor and the type, amount, method of application, storage, and disposal shall be in accordance with applicable Federal and State procedures.

Sec. 8. *Pollution—Air.* (A) *Air Quality.* The Lessee shall utilize and operate all facilities and devices in such a way as to avoid, or, where avoidance is impracticable, minimize air pollution. At all times during construction and operation, Lessee shall conduct its activities in accordance with all applicable air quality standards and related plans of implementation adopted pursuant to the Clean Air Act, as amended (40 U.S.C. §§ 1857–1857–1), as now in effect or as hereafter amended, or if it should be superseded, the statute superseding it, and applicable State standards.

(B) *Dust.* The Lessee shall make every reasonable effort to avoid, or, where avoidance is impracticable, minimize dust problems. Where necessary, sprinkling, oiling, or other means of dust control shall be required on roads and trails. The Lessee shall conduct processing operations so as not to create environmental or health problems associated with dust.

(C) *Burning.* The Lessee shall not burn waste, timber, or debris, except when disposal is essential and other methods of disposal would be more harmful to the environment and when authorized by the Mining Supervisor.

Sec. 9. *Pollution—Water.* (A) *Water Quality.* The Lessee shall utilize and operate all facilities and devices in such a way as to avoid or, where avoidance is impracticable, minimize water pollution. At all times during construction and operation, Lessee shall conduct its activities in accordance with all applicable Federal and State water quality standards and related plans of implementation, as then in force. Where applicable Federal and State standards do not exist, the Mining Supervisor may establish reasonable standards to prevent degradation of water, and the Lessee shall comply with those standards. The Lessee shall not discharge waste water into any aquifer deemed by the Mining Supervisor to be a potentially valuable water supply nor into any aquifer which will discharge the waste into a surface stream.

(B) *Disturbance of Existing Waters.* All construction activities, exclusive of actual mining activities, that may cause the creation of new lakes, drainage of existing ponds, diversion of natural drainages, alternation of stream hydraulics, disturbance of areas of stream beds or degradation of land and water quality or adversely affect the environmental integrity of the area are prohibited unless approved in writing by the Mining Supervisor.

(C) *Control of Waste Waters.* In areas where overburden, water, or waste from mines or processing plants might contain toxic or saline materials, the Lessee shall:

(1) Divert surface or ground water so as to avoid the formation of toxic and saline water and its drainage into streams, or, where avoidance is impracticable, to minimize the formation of such waters and drainage, by preventing the entry or reducing the flow of water into the workings, waste piles, or overburden-storage areas;

(2) Dispose of refuse and spent shale from mining and processing in a manner which will avoid the discharge of toxic drainage or saline water into surface or ground water;

(3) Employ, upon termination of operations or use of any mine, processing plant, or waste disposal site, all practicable closing measures consistent with ecological principle and safety requirements in order to avoid the formation and discharge of toxic or saline water;

(4) Dispose of toxic and saline water derived from mining, processing, or refining operations in a manner that does not pollute surface or ground waters;

(5) During mining operations, monitor spoil and refuse for the presence of materials likely to yield unacceptable alkaline, acidic, saline, or toxic solutes; and

(6) Reinject no water, except in compliance with Federal and State standards then in effect and where authorized to do so by the Mining Supervisor; if the Lessee does reinject water, he shall establish such monitoring as the Mining Supervisor shall require.

(D) *Cuts and Fills.* The Lessee shall not cut or fill near or in streams which will result in siltation or accumulation of debris unless approved in writing by the Mining Supervisor.

(E) *Crossings.* The location of crossings of perennial streams, lakes and rivers must be approved in writing by the Mining Supervisor. To control erosion, the Lessee shall maintain buffer strips at least 200 feet wide on each side of a stream in their natural and undisturbed state unless otherwise authorized in writing by the Mining Supervisor.

(F) *Road Surfacing Material.* All road surfacing material used by the Lessee must be approved by the Mining Supervisor.

Sec. 10. *Pollution—Noise.* The Lessee shall comply with all applicable Federal and State standards on noise pollution, as now in effect or as hereafter amended, or, if they should be superseded, the standards superseding them. In the absence of specific noise pollution standards, the Lessee shall keep noise at or below levels safe and acceptable for humans, as determined by the Mining Supervisor.

Sec. 11. *Rehabilitation.* (A) *In General.* The Lessee shall, in accordance with approved plans, rehabilitate all affected lands to a usable and productive condition consistent with or equal to pre-existing land uses in the area and compatible with existing, adjacent undisturbed natural areas. Rehabilitation methods include, but are not limited to the following: leveling, backfilling, covering the surface with topsoil, and revegetating the spoil banks and pit areas consistent with sound restoration methods. The Lessee shall leave reclaimed land in a usable, non-hazardous condition such that soil erosion and water pollution are avoided or minimized. The Lessee shall, to the extent practicable, conduct such backfilling, leveling and grading concurrently with the mining operations. Upon removal of property at termination of the Lease pursuant to sections 31 and 32 of the Lease, the Lessee shall, in accordance with approved plans, complete the restoration of affected lands to a usable and productive condition at least equal to pre-existing land uses in the area and compatible with existing adjacent undisturbed natural areas.

(B) *Management Plan.* The Lessee shall submit for approval by the Mining Supervisor an erosion control and surface rehabilitation plan as part of any exploration or development plan. The initial plan shall be submitted not less that 60 days prior to start of mining site preparation and updated each year thereafter before March 15. The plan shall include, but not be limited to, detailed information on activities, areas, time schedules, standards, accomplishments, and methods of eliminating or minimizing oil shale development impacts. The Lessee shall base erosion control plans and procedures on a maximum 100-year precipitation rate characteristic of the area. If a 100-year rate is not

available the Lessee shall use data based on the longest period of reliable information. Procedures and plans shall consider flash flood effects, mud flows, mudslides, landslides, rock falls, and other similar types of material mass movements.

(C) *Stabilization of Disturbed Areas.* The Lessee shall leave all disturbed areas in a stabilized condition. Stabilization practices shall include, as determined by the needs of specific sites: seeding; planting; mulching; and the placement of mat binders, soil binders, rock or gravel blankets or other such structures. Seeding and planting shall be repeated, as often as the Mining Supervisor shall deem reasonable, if prior attempts to revegetate are unsuccessful. All trees, snags, stumps or other vegetative material, not having commercial, ecological, wildlife, or construction value, shall be considered for mechanical chipping and spreading in a manner that will aid seeding establishment and soil stabilization.

(D) *Surface Disturbance On-Site.* The Lessee shall correct surface disturbance which may induce soil movement or water pollution, or both, whether during or after construction or mining, in accordance with the surface rehabilitation plan.

(E) *Areas of Unstable Soils.* The Lessee shall, where possible, avoid areas having soils that are susceptible to slides and slips, excessive settlement, severe erosion and soil creep during construction or operation. When such areas cannot be avoided the Lessee shall design construction to insure maximum stability. The Lessee shall make soil foundation investigations in conjunction with construction activities. The Lessee shall make such data available to the Mining Supervisor upon request.

(F) *Materials.* The Lessee shall, when feasible, utilize waste rock from the mining operations for road beds, fills and other similar construction purposes. When not feasible, gravel and other construction materials shall be purchased in accordance with 43 CFR 3610, as now in effect or as hereafter amended, or, if it shall be superseded, the regulation or rule superseding it, except that the sale of such materials from stream beds and upland soil areas shall be avoided unless otherwise approved by the Bureau District Manager.

(G) *Slopes of Cut and Fill Areas.* To the extent consistent with good mining practice, the Lessee shall maintain all cut and fill slopes in a stable condition for the duration of the Lease.

(H) *Impoundments.* The Lessee shall establish safe access to permanent water impoundments for persons, livestock, and wildlife, but, where consumption of such water would be harmful to humans or the use of such water would be detrimental to animals, he shall take necessary steps to prevent access by those to whom it would be harmful or detrimental.

(I) *Flood Plains.* The Lessee shall not construct improvements or conduct operations in flood plains or stream drainages when it is reasonable to expect risk to human life, pollution damage, or destruction of the existing environment caused by flood damage, without the express permission of the Mining Supervisor and without providing for protection of any such improvements constructed.

(J) *Land Reclamation.* The Lessee shall, unless otherwise directed by the Mining Supervisor, backfill, level, final grade, cover with topsoil and initiate revegetation of each segment of the operation area in accordance with the rehabilitation plan as soon as that segment is no longer needed, but not later than one year after completion of the particular operation unless an alternative schedule has been approved by the Mining Supervisor.

(K) *Overburden.* The Lessee shall, unless otherwise directed by the Mining Supervisor, separate overburden material and stockpile it separately as to topsoil, and rock material for later use as fill and as top dressing for rehabilitation of disturbed areas.

(L) *Revegetation.* (1) The Lessee shall revegetate all portions of the Leased Lands which have been disturbed by his operations as soon as possible after the disturbance has ended in order to prevent, or, if prevention is impracticable, to minimize erosion and related problems. The Lessee shall restore the vegetation of disturbed areas by reestablishing permanent vegetation of a quality which will support fauna of the same kinds and in the same numbers as those existing at the time the base line data was obtained under section 1(C) of these Stipulations. Plans for revegetation, including species, density, and timing, must be submitted to the Mining Supervisor for approval. The Mining Supervisor may require any reasonable methods of revegetation, and, if he deems it desirable, may require the Lessee to fence areas to assist revegetation. However, if the Lessor determines, at the time of submission of the detailed development plan under section 10(a) of this lease, that the Leased Lands will, upon the termination of the lease, be put to a different use from that to which they were devoted immediately prior to the issuance of this lease, the Mining Supervisor may require the Lessee to revegetate the land to meet that objective, except that the Lessee shall not be required to expend more money than that needed to meet the first revegetation standard.

(2) The Lessee shall initiate a revegetation program approved by the Mining Supervisor at the start of production to (1) delineate those parameters necessary to establish vegetation at a specific location and (2) show that successional changes in vegetation are compatible with the requirements under subparagraph (1) above.

(3) The Lessee shall demonstrate at the time of submission of the detailed development plan under section 10(a) of this lease that revegetation technology is available to enable him to provide the revegetation of the disturbed areas which is required under paragraph (1) of this subsection. If, in the opinion of the Mining Supervisor, the Lessee has failed to demonstrate the required technology, he shall be required to submit for approval a program designed to obtain the required technology. If the program to obtain the necessary technology is satisfactory, the Mining Supervisor may approve the Lessee's development plan submitted under section 10(a), but, if the Lessee has not demonstrated the necessary technology by the tenth Anniversary Date after the Lease Year in which the development plan under section 10(a) was approved, the Lessee shall cease all exploratory, development, and production operations under that plan until he has demonstrated that the necessary technology is available to him. The Lessee shall report annually to the Mining Supervisor on the progress of this approved program to obtain the required technology. If the progress appears inadequate at any time, the Mining Supervisor may request the Lessee to amend the program. Whenever the Lessee has demonstrated the necessary technology, the required program shall terminate. Where the Mining Supervisor finds the Lessee has conducted his program to obtain technology, including any requested amendments, in a diligent manner and has expended funds in excess of $500,000 on that program, the Secretary may determine the expenditures in excess of that figure to be extraordinary costs within the terms of section 7(d) of the lease and may credit those excess expenditures against any present or future royalties due the lessor, provided the results of the program are made public.

Sec. 12. *Scenic Values.* (A) *Scenic Considerations in General.* The Lessee shall, except where the Mining Supervisor has approved otherwise, use the following standards in all designing, clearing, earthmoving, and construction:

(1) Contours compatible with the natural environment shall be used to avoid straight lines.

(2) Natural colors consistent with the local environment such as pastels or muted shades of brown, green, reds, or grays shall be used in painting of facilities installed on the lease. Bright or unnatural colors shall be avoided except for use in warning signs or signals.

(3) Small natural openings or the edges of larger opening in the natural environment shall be utilized in construction of facilities, or disturbing the land surface.

(4) During the time when the land is disturbed, the portion of land which is not under revegetation programs shall only be those areas required under the mining plan for mining, storage, processing, or disposal operations.

(5) Contouring of the disturbed areas for reclamation shall simulate natural opening or areas consistent with the surrounding topography.

(B) *Consideration of Aesthetic Values.* The Lessee shall consider existing aesthetic values in all planning, construction, reclamation and mining operations. All operations, including, but not limited to, design and construction of roads, pipelines and transmission lines, shall, where practicable, be performed so as to minimize visual impact, make use of the natural topography, and to achieve harmony with the landscape.

(C) *Protection of Landscape.* The Lessee shall design any structures and facilities built under this Lease so that they will, to the extent practicable, blend with the natural landscape.

(D) *Signs.* The Lessee shall design and construct signs that are rustic in appearance and conform to BLM sign standards.

Sec. 13. *Vegetation.* (A) *In General.* (1) The Lessee shall reserve from cutting and removal all timber and other vegetative material outside the clearing boundaries and all blazed, painted or posted trees which are on or mark the clearing boundaries, with the exception of danger trees or snags designated as such by the Mining Supervisor.

(2) The Lessee shall insure that all trees, snags or other woody material cut in connection with clearing operations are felled into the right-of-way and away from live water courses.

(B) *Timber.* The Lessee shall deal with timber in accordance with the following: Clearing and grubbing limits shall be approximately 5 ft. outside of the edge of any cut or fill; where practicable, trees, snags, stumps or other woody material not having wildlife value or value to the Lessee shall be mechanically chipped and spread in a manner that will aid seeding establishment and soil stabilization; clearing boundaries shall be identified on the ground prior to clearing operations.

(C) *Clearing and Stripping.* The Lessee may clear and strip only such land as is necessary for mining, processing, disposal, and other operations under the lease. In connection with such operations the Lessee may clear and strip land necessary for roadbeds, but such roadbed width shall be not more than 25 feet from the centerline unless otherwise specified by the Mining Supervisor.

Sec. 14. *Waste Disposal.* (A) *Mine Waste.* The Lessee shall, in accordance with the detailed development plan under section 10 (a) of this lease, backfill or reclaim excavated material and spent shale and shall compact it thoroughly by machinery to avoid or, where avoidance is impossible, minimize erosion. The Lessee shall design slope faces of waste piles to insure slope stability and shall revegetate slope faces in accordance with the rehabilitation plan.

(B) *Other Disposal Areas.* The term "waste" as used in this subsection (B) means all waste other than mine waste. In accordance with approved plans, the Lessee shall collect, recycle or dispose of waste in sanitary land fills or other disposal areas, and shall use the best practicable portable or permanent waste disposal systems, as approved by the Mining Supervisor. The Lessee shall remove or otherwise dispose of all waste in a manner acceptable to the Mining Supervisor, and in accordance with all applicable standards and guidelines of the State, the United States Public Health Service and the Environmental Protection Agency.

(C) *Disposal of Solid and Liquid Wastes.* The Lessee shall design and construct disposal systems for solid and liquid wastes so as to avoid landslides, control erosion by wind and water, and establish conditions conductive to vegetative growth in the disposal area. The Lessee shall select and prepare disposal sites for wastes so as to avoid downward percolation of leached products and other pollutants into aquifers.

(D) *Impoundment of Water.* No disposal of mine waste, other waste, or the residue from any activity under this Lease shall be disposed of in a manner which could cause an impoundment of water unless plans for spillways and means of diversion and the prevention of both surface and underground water contamination have been prepared by the Lessee and approved by the Mining Supervisor, and the Lessee has complied with those plans.

(E) *Slurry Waste Disposal.* Wherever slurry waste disposal is used the Lessee shall provide impoundments sufficient to contain landslides, mud flows, or waste pile blowouts.

[FR Doc.73-25370 Filed 11-29-73;8:45 am]

APPENDIX I-5

REQUIREMENTS IMPOSED BY THE LEASE

REQUIREMENTS IMPOSED BY THE LEASE,
30CFR231, 43CFR23, and 615DM3
ON THE PROTOTYPE OIL SHALE LEASING PROGRAM

ANS AND REPORTS	AUTHORITY	SUBMITTED BY	SUBMITTED TO	FREQUENCY
PLORATION PLAN	LEASE	LESSEE	AOSS	ONCE, PRIOR TO BEGINNING EXPLORATIONS
TAILED DEVELOPMENT PLAN	LEASE	LESSEE	AOSS	ONCE, PRIOR TO BEGINNING DEVELOPMENT WORK
NUAL PROGRESS REPORT	LEASE	LESSEE	AOSS	EACH YEAR DURING DEVELOPMENT OPERATION DUE ON ANNIVERSARY DATE
ERATIONS REPORT	43CFR23	LESSEE	AOSS	EACH YEAR DURING THE LEASE. DUE AT THE END OF EACH CALENDAR YEAR
PENSE REPORT	LEASE	LESSEE	LESSOR	TO BE DETERMINED BY LESSOR
ODUCTION REPORT	LEASE	LESSEE	LESSOR	QUARTERLY (BASED ON LEASE YEAR)
VIRONMENTAL BASELINE TA REPORT	LEASE	LESSEE	AOSS	PART OF ANNUAL PROGRESS REPORT AND AS SPECIFIED BY OSS
VIRONEMENTAL MONITORING OGRAM REPORT	LEASE	LESSEE	AOSS	PART OF ANNUAL PROGRESS REPORT AND AS SPECIFIED BY OSS
RTATION CORRIDOR ANS (ROADS, PIPELINES, ILITIES)	LEASE	LESSEE	AOSS	ONCE (EACH TYPE PLAN)
SH AND WILDLIFE NAGEMENT PLAN	LEASE	LESSEE	AOSS	PART OF EXPLORATION PLAN/DDP
LTURAL INVESTIGATION PORT	LEASE	LESSEE	AOSS	ONCE, PRIOR TO CONSTRUCTION AND MINING OPERATIONS
ILL CONTINGENCY PLANS	LEASE	LESSEE	AOSS	PART OF EXPLORATION PLAN/DDP
OSION CONTROL AND SURFACE HABILITATION PLAN	LEASE	LESSEE	AOSS	PART OF EXPLORATION PLAN/DDP
VEGETATION PLANS	LEASE	LESSEE	AOSS	PART OF EXPLORATION PLAN/DDP, UPDATED ANNUALLY BY 15 MARCH
ADING AND BACKFILLING PORT	43CFR23	LESSEE	AOSS	FOLLOWS COMPLETION OF THESE ACTIVITIES AS REQUIRED BY EXPLORATION PLAN/DDP
ANTING REPORT	43CFR23	LESSEE	AOSS	FOLLOWS COMPLETION OF THESE ACTIVITIES AS REQUIRED BY EXPLORATION PLAN/DDP
PORT OF CESSATION OR ANDONEMENT OF OPERATIONS	43CFR23	LESSEE	AOSS	30 DAYS PRIOR TO ACTION
ERATIONS STATUS REPORT	30CFR231	AOSS	CONS. DIV. USGS	NOT SPECIFIED
FORMATION REPORTS	30CFR231	AOSS	CONS. DIV. USGS	NOT SPECIFIED

REQUIREMENTS IMPOSED BY THE LEASE
30CFR231, 43CFR23, and 615DM3
ON THE PROTOTYPE OIL SHALE LEASING PROGRAM

PLANS AND REPORTS	AUTHORITY	SUBMITTED BY	SUBMITTED TO	FREQUENCY
TECHNICAL EXAMINATIONS	43CFR23	D.M.& AOSS	LEASE APPLI-CANT	ONCE, FOR INCORPORATION IN LEASE
GENERAL REQUIREMENTS	43CFR23	D.M.& AOSS	LEASE APPLI-CANT	ONCE, FOR INCORPORATION IN LEASE
MINING PLAN	30CFR 231.10	LESSEE	AOSS	ONCE, PRIOR TO BEGINNING DEVELOPMENT OPERATIONS
QUARTERLY PROGRESS REPORT	AOSS	LESSEE	AOSS	SEASONAL QUARTER BASIS
ANNUAL REPORT TO THE SECRETARY	615DM3	OSEAP	SECRE-TARY	ON A CALENDAR YEAR BASIS

INSPECTIONS	AUTHORITY	PERFORMED BY	FREQUENCY
OPERATIONS INSPECTION	30CFR231.3	AOSS	"FREQUENTLY"
WELLS PRODUCTION CHECK	30CFR231.3	AOSS	NOT SPECIFIED
SURFACE PROTECTION AND RECLAMATIONS INSPECTION	30CFR231.3	AOSS	UPON RECEIPT OF LESSEE'S NOTICE TO CEASE OR ABANDON
INSPECTION OF WATER AND AIR MGMT. AND CONTROL MEASURES	30CFR231.3	AOSS	DURING EXPLORATORY AND MINING OPERATIONS
GRADING AND BACKFILLING INSPECTION	30CFR23.10	AOSS	UPON COMPLETION OF SUBJECT ACTIVITY
PLANTING INSPECTION	43CFR23.10	AOSS	AS SOON AS POSSIBLE AFTER THE FIRST FULL GROWING SEASON
AUDITS OF LESSEE'S ACCOUNTS AND BOOKS	30CFR231.62	CPA/AOSS	ANNUALLY OR AT SUCH OTHER TIMES AS AOSS SHALL SPECIFY
RENTALS, ROYALTIES, BONDING INSPECTION	30CFR231.3	AOSS	NOT SPECIFIED

APPENDIX I-6

A LIST OF PARTIES INTERESTED IN THE
PROPOTYPE OIL SHALE LEASING PROGRAM

AGENCIES CONSULTED AND COORDINATED WITH ON

DRAFT E.I.S. FOR COLONY DEVELOPMENT OPERATION

Department of Interior

Bureau of Land Management
Bureau of Indian Affairs
Bureau of Reclamation
Geological Survey
  Water Resources Division
  Conservation Division
Bureau of Mines
Fish and Wildlife Service
Bureau of Outdoor Recreation
Mining Enforcement and
Safety Administration
National Park Service
Office of the Solicitor

Other Federal Departments and Agencies

Federal Highway Administration
Federal Energy Administration
Federal Power Commission
United States Navy
Environmental Protection Agency
Corps of Engineers
Housing and Urban Development
Department of Transportation
Forest Service
Soil Conservation Service
Health, Education and Welfare

State of Colorado

Division of Water Resources
State Historical Society
State Division of Planning
Colorado Division of Highways
Colorado Division of Wildlife
State Health Department
  Water Quality Control Division
  Air Pollution Control Division
Public Utilities Commission

AGENCIES CONSULTED AND COORDINATED WITH

State of Utah

State Highway Department
State Environmental Committee
State Land Office
Division of Wildlife Resources
Department of Development Services
Department of Business Regulation
State Historical Society
Bureau of Environmental Health
  Air Quality Division
  Water Quality Division
Geological Survey

County - Colorado

Eagle County Department of Planning
Rio Blanco County Planner
Garfield County Planner
Pitkin County Planner
Mesa County Planner
District 12 Area Council of Governments
District 11 Area Council of Governments

County - Utah

Grand County Planning Commission
San Juan County Planning Commission

Industry and Private Participation

Institutions:	Colorado State University, University of Colorado, Colorado College, VTN Consolidated Inc., Servco of Denver, and Dames & Moore.
Transportation:	Denver & Rio Grande Western Railroad, Consolidated Freightways, and Union Pacific Railroad
Energy Related Companies:	Marathon Oil Company, Conoco, Texaco, Koch Oil Company, Public Service Company and Gulf Oil Corporation
Conservationists	Colorado Open Space Council

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APPOINTEES OF SECRETARY OF INTERIOR

[illegible]. Thadis Box [illegible]an of College of Natural Resources	Utah State University	USU Logan, Utah 84322
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APPENDIX I-7

DEPARTMENT OF INTERIOR
OFFICE OF THE SECRETARY
ORDER NO. 2948

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ORDER NO. 2948

Subject: Division of Responsibility Between the Bureau of Land Management and the Geological Survey for Administration of the Mineral Leasing Laws - Onshore

Sec. 1. Purpose. The purpose of this Order is to set forth the administrative and management procedures for Departmental onshore mineral leasing and operating activities. The spirit and intent of this Order flow from the Department's mineral management objectives of: orderly and timely resources development, protection of the environment, and receipt of fair market value for leased mineral resources.

Sec. 1(a) Orderly and Timely Resource Development includes the Department's responsibilities to:

(1) Foster, promote, and encourage the exploration for and the production of the mineral deposits from the leasable lands; promote competition;

(2) Encourage the active development of the mineral deposits in the leasable lands in a manner compatible with the use of the same lands for other purposes; assure that mineral developers receive the acreage necessary for economic plant investment, development, and production;

(3) Encourage the maximum ultimate recovery of the mineral deposit; prevent waste; promote the conservation of the mineral resources;

(4) Assure adequate minimum production and diligent development requirements for mineral deposits.

(b) Protection of the Environment includes the Department's responsibilities to:

(1) Assure that mineral exploration and production be conducted with the maximum protection of the environment;

(2) Assure the rehabilitation of disturbed lands;

(3) Assure that precautions are taken to protect public health and safety; and

(4) Assure full compliance with the spirit and objectives of the National Environmental Policy Act of 1969, other Federal environmental legislation, and supporting Executive Orders and regulations.

(c) Receipt of Fair Market Value for Leased Mineral Resources includes the Department's responsibilities to assure the public a fair market value return for the use of public lands and the disposition of its mineral resources.

Sec. 2. Agency Responsibilities. The BLM exercises at the Bureau level the Secretary's discretionary authority to determine whether or not leases, permits, and licenses are to be issued. The Bureau of Land Management is responsible for issuing mineral leases, permits, and licenses, and is the office of record in mineral leasing matters. The Geological Survey is responsible for all geologic, engineering, and economic value determinations for the Department's mineral management program. These determinations include: the mineral characteristics of lease and permit areas; parcelling; amounts of bonds; royalties; unit values; rentals; mineral resource evaluations; reserves; investment, diligent development, and minimum production requirements; and all other terms and conditions relating to mineral operations under leases and permits. Geological Survey exercises the Secretary's delegated authority regarding operations conducted within the area of operation by permittees, lessees, and licensees and determines the actions to be taken by them from the standpoint of the development, conservation, and management of mineral resources under the jurisdiction of the Department. GS will refer to BLM any instances of noncompliance with lease terms requiring cancellation action, and BLM will inititate the necessary action.

For the purpose of this Order, the area of operation is defined as that area of the present and planned mine, oil and gas field, or geothermal resource field exploratory, development, and production operations, as presented in an approved exploration or mining plan, drilling permit, oil, gas, or geothermal field development plan, or plan for the abandonment of wells or operations. The area of operation may cover a fraction of a lease or permit area, or it may cover several lease or permit areas. It encompasses the general area needed for storage piles, spoils piles, tailings ponds, on-project mill sites, flow lines, separators, surge tanks, storage tanks, on-project truck or rail-loading stations, drill pads, mud pits, workshops, compressors, generators, on-project power plants, and other such facilities used for on-project mine, oil and gas field, or geothermal resource field exploratory, development, and production operations.

(a) Environmental Protection. The Bureau of Land Management, in cooperation with the Geological Survey, formulates the general requirements to be incorporated in leases, permits, and licenses for the protection of the surface and non-mineral resources and for reclamation. The Geological Survey, before approving exploration and mining plans, drilling permits, oil, gas, or geothermal field development plans, or plans for the abandonment of wells or operations, consults with the Bureau of Land Management on the adequacy of the surface use, environmental protection, and reclamation aspects of the plans and will not grant approval if inconsistent with the BLM's recommendations without further discussions with BLM. If differences remain after these further discussions, the resolution is made by the Assistant Secretary--Mineral Resources and the Assistant Secretary--Public Land Management. If required, the Under Secretary resolves any remaining differences. The BLM is responsible for compliance examinations of environmental protection requirements outside the operating area and for reporting infractions to the GS for discussions with, or orders to, the permittee, lessee, or licensee. GS examines operations to ensure compliance with environmental protection and rehabilitation requirements inside the operating area. With respect to approval of access roads, pipelines, utility routes and other surface uses outside the operating area, the Bureau of Land Management has the primary responsibility but obtains the recommendations of the Geological Survey before taking final action. Orders to operators for any remedial action is the responsibility of the Geological Survey.

(b) Expertise. The Geological Survey is responsible for maintaining engineering, geologic, geophysical, economic, and other technical expertise needed by the Department to assure compliance with applicable laws, operating regulations, and the objectives of the Department's mineral management program. The Bureau of Land Management is responsible for maintaining expertise needed by the Department for action on applications filed with BLM under the mineral leasing laws to assure compliance with applicable laws, leasing regulations, and the objectives of the Department's mineral management program.

(c) Contacts with Applicants.

(1) Prior to the issuance of mineral leases, permits, and licenses, the Bureau of Land Management will represent the Secretary in dealing with applicants.

(2) After issuance and during the exploration, development, and production phases of leases, permits, and licenses, and until a lease, permit, or license has terminated (at which time management is the sole responsibility of BLM) the Geological Survey is the sole representative of the Secretary in all matters relating to the supervision of operations.

Sec. 3. Issuance of Mineral Leases, Permits, and Licenses.

(a) Applications. Prior to the issuance of mineral prospecting permits, leases, or licenses, the Bureau of Land Management refers all applications for such permits, leases, or licenses to the Geological Survey for a report as outlined in (b) below.

(1) The Geological Survey is responsible for determining, under the mineral leasing laws and regulations, if sufficient information is known about a mineral deposit to warrant offering the deposit for lease by competitive sale and to notify the Bureau of Land Management of its determination. If the Geological Survey finds that sufficient information is not available to warrant competitive leasing, it notifies the Bureau of Land Management of its conclusions so that the Bureau of Land Management may issue a prospecting permit or noncompetitive lease, as appropriate. The Geological Survey establishes prospecting requirements for prospecting permits. When lands are to be leased, the Geological Survey determines and reports, as appropriate, on: the mineral characteristics of lease and permit areas; parcelling; amounts of bonds; royalties; unit values; rentals; mineral resource evaluations; reserves; investments; diligent development and minimum production requirements; and all other terms and conditions pertaining to lease operations, including environmental and surface rehabilitation stipulations relating to mineral exploration and extraction. With respect to applications for licenses, the Geological Survey determines and reports as to whether the license may be issued.

(2) The Geological Survey is responsible for determining whether a prospecting permittee has demonstrated that the lands contain a mineral deposit having the characteristics required by law and regulations to qualify for a preference right lease and to notify the Bureau of Land Management.

(3) The Bureau of Land Management refers to the Geological Survey all other type applications received which, if approved, may affect operations on existing permits, leases, or licenses.

(4) The Bureau of Land Management notifies the Geological Survey of known oil, gas, and geothermal resource geophysical exploration activity, including the area involved, the type of survey employed, and the name of the operator.

(5) All applications for noncompetitive oil and gas, mineral, and geothermal resource leases filed with the Bureau of Land Management will, prior to issuance of a lease, be referred to the Geological Survey for a determination as to whether the lands are within a known geologic structure (KGS), a known geothermal resource area (KGRA), or a known leasing area (KLA).

(b) Mineral Resource Evaluation Report. GS is responsible for submitting a report of its findings, mineral resource evaluations, and resultant recommendations to the BLM, together with a summary explanation of how the resource evaluations were developed from geophysical, geologic, economic, and engineering data available at the time of the evaluation. The BLM reviews these findings and recommendations in light of multiple-use management requirements and will not issue leases or permits inconsistent with the findings and recommendations without further discussion with GS. If differences remain after further discussion, the resolution is made by the Assistant Secretary--Mineral Resources and the Assistant Secretary--Public Land Management. If required, the Under Secretary resolves any remaining differences.

(c) Competitive Lease Sales. The Bureau of Land Management advertises and conducts competitive lease sales. The Geological Survey's resource evaluations will be used and the Geological Survey will have representatives at the sale and renders a post-sale recommendation to BLM regarding acceptance or rejection of the bids, which must be confirmed in writing.

(d) Files and Records. BLM maintains the official application, permit, and lease case files and forwards to the Geological Survey a copy of each permit, lease, and license, together with copies of relevant correspondence thereafter conducted by the Bureau. The GS forwards to the BLM copies of mining and exploration plan applications, drilling permit applications, and relevant items submitted by the applicants directly to the GS, except confidential proprietary information cited under paragraph (e) below.

(e) Security of Information. The Geological Survey is responsible for receiving and protecting for the confidential use of the Federal Government all proprietary geological, geophysical, engineering, economic, statistical, or other information, mineral resource data, and well logs required to be submitted under Title 30 CFR, Parts 200, 211, 216, 221, 231, 270, and related regulations. The Survey Office receiving such information is designated the Office of Control for those data. Authorized officials of BLM or other surface-managing agencies having a need to see such information will normally make appropriate arrangements to visit the Office of Control for access to such data and for technical advice based on it pertinent to their management responsibilities.

Sec. 4. Mineral Reports. The Geological Survey is responsible for preparing and submitting to the Bureau of Land Management mineral classification and evaluation reports with respect to the leasable mineral value of lands within proposed exchanges, withdrawals, sales, land entries, or other disposals and all other land transactions. The Geological Survey, upon request, also prepares and furnishes mineral reports and other information to the Bureau of Land Management needed for its use in long-range multiple-use planning or inventory of the public lands.

Sec. 5. General Relationships. Such additional references, reports, interchange of information, and advice shall be made by or between the Bureau of Land Management and Geological Survey as may be necessary to perpetuate or improve current practice and provide effective administration of the mineral leasing laws.

The Bureau of Land Management and the Geological Survey must submit to each other for review and recommendations any proposed changes in standard lease terms, regulations, instructions, or other changes that would affect each agency's management responsibilities.

Sec. 6. Implementation of Order. It is intended that there will be no duplication by the BLM or GS of the functions assigned by this Order. BLM and GS will promptly bring their manuals and instructions into agreement with the terms and the spirit and intent of this Order.

Sec. 7. Revocation. The Secretary's instruction (procedures relating to the administration of the mineral leasing laws - General Land Office and Geological Survey) dated September 22, 1925 (51 L. D. 219) is revoked.

(sgd) Rogers C. B. Morton

OCT - 6 1972

Secretary of the Interior

APPENDIX I-8

30 CFR 231
and
43 CFR 23

Title 43—PUBLIC LANDS: INTERIOR

Subtitle A—Office of the Secretary of the Interior

[Circular No 2259]

PART 23—SURFACE EXPLORATION, MINING AND RECLAMATION OF LANDS

A new Part 23 is hereby added to Title 43 Code of Federal Regulations, to become effective upon publication in the FEDERAL REGISTER.

Sec.

23.1 Purpose.
23.2 Scope.
23.3 Definitions.
23.4 Application for permission to conduct exploration operations.
23.5 Technical examination of prospective surface exploration and mining operations.
23.6 Basis for denial of a permit, lease, or contract.
23.7 Approval of exploration plan.
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23.9 Performance bond.
23.10 Reports: Inspection.
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23.12 Appeals.
23.13 Consultation.

§ 23.1 Purpose.

It is the policy of this Department to encourage the development of the mineral resources under its jurisdiction where mining is authorized. However, the public interest requires that, with respect to the exploration for, and the surface mining of, such minerals, adequate measures be taken to avoid, minimize, or correct damage to the environment—land, water, and air—and to avoid, minimize, or correct hazards to the public health and safety. The regulations in this part prescribe procedures to that end.

§ 23.2 Scope.

(a) Except as provided in paragraphs (b) and (c) of this section, the regulations in this part provide for the protection and conservation of nonmineral resources during operations for the discovery, development, surface mining, and onsite processing of minerals under permits, leases, or contracts issued pursuant to: The Mineral Leasing Act of February 25, 1920, as amended (30 U.S.C. 181–287); the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351–359); the Materials Act of July 31, 1947, as amended (30 U.S.C. 601–604); and title 23, United States Code, section 317, relating to appropriation for highway purposes of lands owned by the United States.

(b) The regulations in this part do not cover the exploration for oil and gas or the issuance of leases, or operations thereunder, for oil and gas under the mineral leasing acts, which are covered by regulations in Subpart 3107 and Part 3120 of this title and 30 CFR Part 221; neither do they cover minerals underlying Indian tribal or allotted lands, which are subject to regulations in Title 25 CFR, nor minerals subject to the general mining laws (30 U.S.C. 21–54); nor minerals under the Materials Act which are under the jurisdiction of the Secretary of Agriculture (74 Stat. 205); nor minerals underlying lands, the surface of which is not owned by the U.S. Government.

(c) When more than one permit or contract is expected to be issued to dispose of materials in a particular deposit or tract of land, such as community pits or common use areas, no requirement for reclamation will be made in such permits or contracts and the burden of reclamation will be assumed by the Government. Where reclamation is not required because more than one permit or contract is expected to be issued, there shall be added to the sales price under each permit or contract a reasonable charge to defer the cost of reclamation. In computing such added charge, the authorized officer shall establish the estimated cost of reclamation upon completion of extractive operations for the deposit and the estimated total volume of material to be extracted. The added charge shall be a proportionate share of the estimated cost of reclamation in the same ratio as the material sold under the permit or contract bears to the total estimated volume of the deposit which is expected to be extracted.

(d) The regulations in this part shall apply only to permits, leases, or contracts issued subsequent to the date on which the regulations become effective.

§ 23.3 Definitions.

As used in the regulations in this part:

(a) "Mineral leasing acts" means the Mineral Leasing Act of February 25, 1920, as amended and supplemented (30 U.S.C. 181–287) and the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351–359);

(b) "Materials Act" means the Act of July 31, 1947, as amended (30 U.S.C. 601–604);

(c) "Mining supervisor" means the Regional Mining Supervisor, or his authorized representative, of the Geological Survey authorized as provided in 30 CFR 211.3 and 231.2 to supervise operations on the land covered by a permit or lease;

(d) "District manager" means the manager of the district office or other authorized officer of the Bureau of Land Management having administrative jurisdiction of and responsibility for the land covered by a permit, lease, contract, application, or offer;

(e) "Overburden" means all the earth and other materials which lie above a natural deposit of minerals and such earth and other materials after removal from their natural state in the process of mining;

(f) "Area of land to be affected" or "area of land affected" means the area of land from which overburden is to be or has been removed and upon which the overburden or waste is to be or has been deposited, and includes all lands affected by the construction of new roads or the improvement or use of existing roads to gain access to an operation and for haulage;

(g) "Operation" means all of the premises, facilities, roads, and equipment used in the process of determining the location, composition or quality of a mineral deposit, or in developing, extracting, or onsite processing of a mineral deposit in a designated area;

(h) "Method of operation" means the method or manner by which a cut or open pit is made, the overburden is placed or handled, water is controlled or affected and other acts performed by the operator in the process of exploring or uncovering and removing or onsite processing of a mineral deposit;

(i) "Holder" or "operator" means the permittee, lessee, or contractor designated in a permit, lease, or contract;

(j) "Reclamation" means measures undertaken to bring about the necessary reconditioning or restoration of land or water that has been affected by exploration or mineral development, mining or onsite processing operations, and waste disposal, in ways which will prevent or control onsite and offsite damage to the environment.

§ 23.4 Application for permission to conduct exploration operations.

No person shall, in any manner or by any means which will cause the surface of lands to be disturbed, explore, test, or prospect for minerals (other than oil and gas) subject to disposition under the mineral leasing acts or the Materials Act without first filing an application for, and obtaining, a permit, lease or contract which authorizes such exploring, testing, or prospecting.

§ 23.5 Technical examination of prospective surface exploration and mining operations.

(a) (1) In connection with an application for a permit or lease under the mineral leasing acts or an application for a permit or an offer to make a contract under the Materials Act, the district manager shall make, or cause to be made, a technical examination of the prospective effects of the proposed exploration or surface mining operations upon the environment. The technical examination shall take into consideration the need for the preservation and protection of other resources, including recreational, scenic, historic, and ecological values; the control of erosion, flooding, and pollution of water; the isolation of toxic materials; the prevention of air pollution; the reclamation by revegetation, replacement of soil, or by other means, of lands affected by the exploration or mining operations; the prevention of slides; the protection of fish and wildlife and their habitat; and the prevention of hazards to public health and safety.

(2) A technical examination of an area should be made with the recognition that actual potential mining sites and mining operations vary widely with respect to topography, climate, surrounding land uses, proximity to densely used areas, and other environmental influences and that mining and reclamation requirements should provide sufficient flexibility to permit adjustment to local conditions.

(b) Based upon the technical examination, the district manager shall formulate the general requirements which the applicant must meet for the protection of nonmineral resources during the conduct of exploration or mining operations and for the reclamation of lands or waters affected by exploration or mining operations. The general requirements shall be made known in writing to the applicant before the issuance of a permit or lease or the making of a contract, and upon acceptance thereof by the applicant, shall be incorporated in the permit, lease, or contract. If an application or offer is made under the Mineral Leasing Act for Acquired Lands and if the lands are under the jurisdiction of an agency other than the Department of the Interior, the requirements must incorporate provisions prescribed by that agency. If the application or offer is made under the Mineral Leasing Act of February 25, 1920, or the Materials Act, and if the lands are under the jurisdiction of an agency other than the Department of the Interior, the district manager shall consult representatives of the agency administering the land and obtain their recommendations for provisions to be incorporated in the general requirements. If the district manager does not concur in the recommendations, the issues shall be referred for resolution to the Under Secretary of the Department of the Interior and the comparable officer of the agency submitting the recommendations. In the case of disagreement on the issues which are so referred, the Secretary of the Interior shall make a determination on the recommendations which shall be final and binding.

(c) In each instance in which an application or offer is made under the mineral leasing acts, the mining supervisor shall participate in the technical examination and in the formulation of the general requirements. If the lands covered by an application or offer are under the jurisdiction of a bureau of the Department of the Interior other than the Bureau of Land Management, the district

manager shall consult representatives of the bureau administering the land. If the lands covered by the application or offer are under the jurisdiction of an agency other than the Department of the Interior and that agency makes a technical examination of the type provided for in paragraph (a) of this section, district managers and mining supervisors are authorized to participate in that examination.

(d) Whenever it is determined that any part of the area described in an application or offer for a permit, lease, or contract is such that previous experience under similar conditions has shown that operations cannot feasibly be conducted by any known methods or measures to avoid—

(1) Rock or landslides which would be a hazard to human lives or endanger or destroy private or public property; or

(2) Substantial deposition of sediment and silt into streams, lakes, reservoirs; or

(3) A lowering of water quality below standards established by the appropriate State water pollution control agency, or by the Secretary of the Interior; or

(4) A lowering of the quality of waters whose quality exceeds that required by the established standards—unless and until it has been affirmatively demonstrated to the State water pollution control agency and to the Department of the Interior that such lowering of quality is necessary to economic and social development and will not preclude any assigned uses made of such waters; or

(5) The destruction of key wildlife habitat or important scenic, historical, or other natural or cultural features; the district manager may prohibit or otherwise restrict operations on such part of an area.

(e) If, on the basis of a technical examination, the district manager determines that there is a likelihood that there will be a lowering of water quality as described in paragraphs (d) (3) and (4) of this section caused by the operation, no lease or permit shall be issued or contract made until after consultation with the Federal Water Pollution Control Administration and a finding by the Administration that the proposed operation would not be in violation of the Federal Water Pollution Control Act, as amended (33 U.S.C. sec. 466 et seq.) or of Executive Order No. 11288 (31 F.R. 9261). Where a permit or lease is involved the district manager's determination shall be made in consultation with the mining supervisor.

(f) Each notice of a proposed appropriation of a materials site filed by the Department of Transportation under 23 U.S.C. 317 shall be transmitted to the proper district manager. The district manager shall cause a technical examination to be made as provided in paragraph (a) of this section and shall formulate the requirements which the State highway department or its nominee must meet. If the land covered by the proposed appropriation is under the jurisdiction of a bureau of the Department other than the Bureau of Land Management, the district manager shall consult representatives of the bureau administering the land. If the district manager determines, or, in an instance in which the land is administered by another bureau, a representative of that bureau determines that the proposed appropriation is contrary to the public interest or is inconsistent with the purposes for which such land or materials are reserved, the district manager shall promptly submit the matter to the Secretary of the Interior for his decision. In other instances, the district manager shall notify the Department of Transportation of the requirements and conditions which the State highway department or its nominee must meet.

§ 23.6 Basis for denial of a permit, lease, or contract.

An application or offer for a permit, lease, or contract to conduct exploratory or extractive operations may be denied any applicant or offeror who has forfeited a required bond because of failure to comply with an exploration or mining plan. However, a permit, lease, or contract may not be denied an applicant or offeror because of the forfeiture of a bond if the lands disturbed under his previous permit, lease, or contract have subsequently been reclaimed without cost to the Federal Government.

§ 23.7 Approval of exploration plan.

(a) Before commencing any surface disturbing operations to explore, test, or prospect for minerals covered by the mineral leasing acts the operator shall file with the mining supervisor a plan for the proposed exploration operations. The mining supervisor shall consult with the district manager with respect to the surface protection and reclamation aspects before approving said plan.

(b) Before commencing any surface disturbing operations to explore, test, or prospect for materials covered by the Materials Act the operator shall file with the district manager a plan for the proposed exploration operations.

(c) Depending upon the size and nature of the operation and the requirements established pursuant to § 23.5 the mining supervisor or the district manager may require that the exploration plan submitted by the operator include any or all of the following:

(1) A description of the area within which exploration is to be conducted;

(2) Two copies of a suitable map or aerial photograph showing topographic, cultural and drainage features;

(3) A statement of proposed exploration methods, i.e. drilling, trenching, etc., and the location of primary support roads and facilities;

(4) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, damage to fish and wildlife or other natural resources, and hazards to public health and safety both during and upon abandonment of exploration activities.

(d) The mining supervisor or the district manager shall promptly review the exploration plan submitted to him by the operator and shall indicate to the operator any changes, additions, or amendments necessary to meet the requirements formulated pursuant to

ploration and mining plans shall be consistent with and responsive to the requirements of the lease or permit for the protection of nonmineral resources and for the reclamation of the surface of the lands affected by the operations. The mining supervisor shall consult with the other agencies involved, and shall promptly approve the plans or indicate what modifications of the plans are necessary to conform to the provisions of the applicable regulations and the terms and conditions of the permit or lease. No operations shall be conducted except under an approved plan.

(b) *Exploration plans.* The mining supervisor may require that an exploration plan include any or all of the following:

(1) A description of the area within which exploration is to be conducted;

(2) Five copies of a suitable map or aerial photograph showing topographic, cultural, and drainage features;

(3) A statement of proposed exploration methods, i.e., drilling, trenching, etc., and the location of primary support roads and facilities;

(4) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, pollution of air, damage to fish and wildlife or other natural resources, and hazards to public health and safety both during and upon abandonment of exploration activities.

(c) *Mining plans.* The mining supervisor may require that a mining plan include any or all of the following:

(1) A description of the location and area to be affected by the operations;

(2) Five copies of a suitable map, or aerial photograph showing the topography, the area covered by the permit or lease, the name and location of major topographic and cultural features, and the drainage plan away from the area affected;

(3) A statement of proposed methods of operating, including a description of the surface or underground mining methods; the proposed roads or vehicular trails; the size and location of structures and facilities to be built;

(4) An estimate of the quantity of water to be used and pollutants that are expected to enter any receiving waters;

(5) A design for the necessary impoundment, treatment or control of all runoff water and drainage from workings so as to reduce soil erosion and sedimentation and to prevent the pollution of receiving waters;

(6) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, pollution of air, damage to fish and wildlife or other natural resources, and hazards to public health and safety;

(7) A statement of the proposed manner and time of performance of work to reclaim areas disturbed by the operations.

(d) *Revegetation; regrading; backfilling.* In those instances in which the permit or lease requires the revegetation of an area to be affected by operations the exploration or mining plan shall show:

(1) Proposed methods of preparation and fertilizing the soil prior to replanting;

(2) Types and mixtures of shrubs, trees, or tree seedlings, grasses or legumes to be planted; and

(3) Types and methods of planting, including the amount of grasses or legumes per acre, or the number and spacing of trees, or tree seedlings, or combinations of grasses and trees.

If the permit or lease requires regrading and backfilling, the exploration or mining plan shall show the proposed methods and the timing of grading and backfilling of areas of lands affected by the operations.

(e) *Changes in plans.* Exploration and mining plans may be changed by mutual consent of the mining supervisor and the operator at any time to adjust to changed conditions or to correct an oversight. To obtain approval of a changed or supplemental plan the operator shall submit a written statement of the proposed changes or supplement and the justification for the changes proposed.

(f) *Partial plan.* If circumstances warrant, or if development of an exploration or mining plan for the entire operation is dependent upon unknown factors which cannot or will not be determined except during the progress of the operations, a partial plan may be approved and supplemented from time to time. The operator shall not, however, perform any operation except under an approved plan.

§ 231.11 Maps of underground workings and surface operations and equipment.

Maps of underground workings and surface operations shall be drawn to a scale acceptable to the mining supervisor. All maps shall be appropriately marked with reference to Government land marks or lines and elevations with reference to sea level. When required by the mining supervisor vertical projections and cross sections shall accompany plan views. Maps shall be based on accurate surveys made at least annually and as may be necessary at other times. Accurate copies of such maps on reproducible material or prints thereof shall be furnished the mining supervisor when and as required. The maps shall be posted to date and submitted to the mining supervisor at least once each year. The accuracy of maps furnished shall be certified by a professional engineer, professional land surveyor, or other professionally qualified person.

§ 231.12 Other maps.

(a) The operator shall prepare such maps of the leased lands as in the judgment of the mining supervisor are necessary to show the surface boundaries, improvements, and topography, including subsidence resulting from mining, and the geological conditions so far as determined from outcrops, drill holes, exploration or mining. All excavations in each separate bed or deposit shall be shown in such manner that the production of minerals for any royalty period can be accurately ascertained.

(b) In the event of the failure of the operator to furnish the maps required, the mining supervisor shall employ a competent mine surveyor to make a survey and maps of the mine, and the cost thereof shall be charged to and promptly paid by the operator.

(c) If any map submitted by an operator is believed to be incorrect, the mining supervisor may cause a survey to be made, and if the survey shows the map submitted by the operator to be substantially incorrect in whole or in part, the cost of making the survey and preparing the map shall be charged to and promptly paid by the operator.

Bore Holes and Samples

§ 231.20 Core or test hole, cores, samples, cuttings, mill products.

(a) The operator shall submit promptly to the mining supervisor signed copies, in duplicate, of records of all core or test holes made on the leased or permit lands, the records to be in such form that the position and direction of the holes can be accurately located on a map. The records shall include a log of all strata penetrated and conditions encountered, such as water, quicksand, gas, or unusual conditions, and copies of analyses of all samples analyzed from strata penetrated shall be transmitted to the mining supervisor as soon as obtained or at such time as specified by the mining supervisor. All drill holes will be logged under supervision of a competent geologist or engineer, and the lessees will furnish to the mining supervisor a detailed lithologic log of each drill hole and all other in-hole surveys, such as electric logs, gamma ray neutron logs, sonic logs or any other logs produced. The core from test holes shall be retained by the operator for 1 year and shall be available for inspection at the convenience of the mining supervisor, and he shall be privileged to cut such cores and receive samples of such parts as he may deem advisable, or on request of the mining supervisor the operator shall furnish such samples of strata, drill cuttings, and mill products as may be required.

(b) Drill holes for development or holes for prospecting shall be abandoned to the satisfaction of the mining supervisor by cementing and/or casing or by other methods approved in advance by the mining supervisor and in a manner to protect the surface and not to endanger any present or future underground operation or any deposit of oil, gas, other mineral substances, or water strata.

(c) At the option of the mining supervisor or the operator drill holes may be converted to surveillance wells for the purpose of determining the effect of subsequent operations upon the quantity, quality, or pressure of ground water or mine gases.

(d) When drilling on lands valuable or potentially valuable for oil and gas or geothermal resources drilling equipment shall be equipped with blowout control devices acceptable to the mining supervisor before penetrating more than 100

feet of consolidated sediments unless a greater depth is approved in advance by the mining supervisor.

Welfare and Safety

§ 231.25 Sanitary, welfare, and safety arrangements.

The underground and surface sanitary, welfare, health, and safety arrangements shall be in accordance with the recommendations of the U.S. Public Health Service and the applicable standards in Parts 55, 56, and 57, Chapter I of this title.

Cross Reference: For regulations of the U.S. Public Health Service, Department of Health, Education, and Welfare, see 42 CFR Chapter I.

Mining Methods

§ 231.30 Good practice to be observed.

The operator shall observe good practice following the highest standards in prospecting, exploration, testing, development, and mining, sinking wells, shafts, and winzes, driving drifts and tunnels, stoping, blasting, transporting ore and materials, hoisting, the use of explosives, timbering, pumping, and other activities on the leased or permit lands.

§ 231.31 Ultimate maximum recovery; information regarding mineral deposits.

(a) Mining operations shall be conducted in a manner to yield the ultimate maximum recovery of the mineral deposits, consistent with the protection and use of other natural resources and the protection and preservation of the environment—land, water, and air. All shafts, main exits, and passageways, as well as overlying beds or mineral deposits that at a future date may be of economic importance, shall be protected by adequate pillars in the deposit being worked or by such other means as approved by the mining supervisor.

(b) Information, obtained regarding the mineral deposit being worked and other mineral deposits on the leased or permit lands shall be fully recorded and a copy of the record furnished to the mining supervisor.

§ 231.32 Pillars left for support.

Sufficient pillars shall be left in first mining to insure the ultimate maximum recovery of mineral deposits when the time arrives for the removal of pillars. Boundary pillars shall in no case be less than 50 feet thick unless otherwise specified in writing by the mining supervisor. Boundary and other main pillars shall be mined only with the written consent or by order of the mining supervisor or his authorized subordinates.

§ 231.33 Boundary pillars and isolated blocks.

(a) If the ore on adjacent lands subject to these regulations has been worked out beyond any boundary pillar, if the water level beyond the pillar is below the lessee's adjacent operations, and if no other hazards exist, the lessee shall, on the written demand of the mining supervisor, mine out and remove all available ore in such boundary pillar, both in the lands covered by the lease and in the adjoining premises, when the mining supervisor determines that it can be mined without undue hardship to the lessee.

(b) If the mining rights in adjoining premises are privately owned or controlled, an agreement may be made with the owners of such interests for the extraction of the ore in the boundary pillars.

(c) Narrow strips of ore between leased lands and the outcrop on other lands subject to these regulations and small blocks of ore adjacent to leased lands that would otherwise be isolated or lost may be mined under the provisions specified in paragraphs (a) and (b) of this section.

§ 231.34 Development on leased tract through adjoining mines as part of a mining unit.

A lessee may mine his leased tract from an adjoining underground mine on land privately owned or controlled or from adjacent leased lands, under the following conditions:

(a) A mine that is on the land privately owned or controlled shall conform to all sections in the regulations in this part.

(b) The only connections between the mine on land privately owned or controlled and the mine on leased land shall be the main haulageways, the ventilationways, and the escapeways. Substantial concrete frames and fireproof doors that may be closed in an emergency and opened from either side shall be installed in each such connection. Other connections through the boundary pillars shall not be made until both mines are about to be exhausted and abandoned. The mining supervisor may waive any of the requirements in this paragraph when, in his judgment, such a waiver would not conflict with the regulations in Part 57, Chapter I of this title and would not entail substantial loss of ore.

(c) Free access for inspection of said connecting mine on land privately owned or controlled shall be given at any reasonable time to the mining supervisor or other representative of the Secretary of the Interior.

(d) If a lessee operating on a lease through a mine on land privately owned or controlled does not maintain the mine in accordance with the operating regulations, operations on the leased land may be ordered stopped or departmental seals applied by the mining supervisor, and the operations on leased lands shall be stopped.

§ 231.35 Minerals soluble in water; brines; mineral taken in solution.

In mining or prospecting deposits of potassium or other minerals soluble in water, all wells, shafts, prospect holes, and other openings shall be adequately protected with neat cement or other suitable materials against the coursing or entrance of water; and the operator shall, on orders of the mining supervisor, backfill with rock or other suitable material to protect the roof from breakage when there is a danger of the entrance of water. On leased or permit lands containing brines, due precaution shall be exercised to prevent the deposits becoming diluted or contaminated by the mixture of water or valueless solution. Where minerals are taken from the earth in solution, such extraction shall not be within 500 feet of the boundary line of the leased lands without the written permission of the mining supervisor.

Protection Against Mine Hazards

§ 231.40 Surface openings.

(a) The operator shall substantially fill in, fence, protect or close all surface openings, subsidence holes, surface excavations or workings which are a hazard to people or animals. Such protective measures shall be maintained in a secure condition during the term of the permit or lease. Before abandonment of operations all openings, including water discharge points, shall be closed to the satisfaction of the mining supervisor.

(b) Reclamation or protection of surface areas no longer needed for operations should commence without delay. The mining supervisor shall designate such areas where restoration or protective measures, or both, must be taken.

§ 231.41 Abandonment of underground workings.

No underground workings or part thereof shall be permanently abandoned and rendered inaccessible without the advance and written approval of the mining supervisor.

§ 231.42 Flammable gas and dust.

Mines in which flammable gas is found or explosive dust produced shall be subject to the coal-mining operating regulations in Part 211 of this chapter. An "explosive dust" is a combustible solid in airborne dispersion capable of propagating flame when ignited.

§ 231.43 Fire protection.

All structures within 100 feet of any mine opening shall be protected against fire and constructed of fire resistant material. Flammable material shall not be stored within 100 feet of a mine exit. All shafts shall be fireproof, or, adequate fire-control devices, satisfactory to the mining supervisor, shall be installed. All underground offices, stations, shops, magazines, and stores shall be so constructed, equipped, and maintained as to reduce the fire hazard to a minimum. Sufficient fire-fighting apparatus shall be maintained in working condition at the mine exits and at convenient points in the mine workings for fire emergencies. An adequate water supply shall be held in storage tanks or reservoirs for fire emergencies and shall be available for immediate use through connecting pipelines for either surface or underground fires.

Milling; Waste From Mining or Milling

§ 231.50 Milling.

It shall be the duty of the operator to conduct milling operations pursuant to the terms of the lease, the approved mining plan, and the regulations in this part and to use due diligence in the reduction, concentration, or separation of mineral substances by mechanical or chemical

processes, by distillation, by evaporation, or other means so that the percentage of salts, concentrates, oil, or other mineral substances recovered shall be in accordance with approved practices.

§ 231.51 Disposal of waste.

The operator shall dispose of all wastes resulting from the mining, reduction, concentration, or separation of mineral substances in accordance with the terms of the lease, approved mining plan, the regulations in this part, and the directions of the mining supervisor.

Production Records and Audit

§ 231.60 Books of account.

Operators shall maintain books in which will be kept a correct account of all ore and rock mined, of all ore put through the mill, of all mineral products produced, and of all ore and mineral products sold and to whom sold, the weight, assay value, moisture content, base price, dates, penalties, and price received, and the percentage of the mineral products recovered and lost shall be shown.

Cross Reference: See Part 200 of this chapter for reports required to be filed and the forms to be used.

§ 231.61 Royalty basis.

The sale price basis for the determination of the rates and amount of royalty shall not be less than the highest and best obtainable market price of the ore and mineral products, at the usual and customary place of disposing of them at the time of sale, and the right is reserved to the Secretary of the Interior to determine and declare such market price, if it is deemed necessary by him to do so for the protection of the interests of the lessor.

§ 231.62 Audits.

An audit of the lessee's accounts and books may be made annually or at such other times as may be directed by the mining supervisor, by certified public accountants, and at the expense of the lessee. The lessee shall furnish free of cost duplicate copies of such annual or other audits to the mining supervisor, within 30 days after the completion of each auditing.

Inspection, Issuance or Orders, and Enforcement of Orders

§ 231.70 Inspection of underground and surface conditions; surveying, estimating, and study.

Operators shall provide means at all reasonable hours, either day or night, for the mining supervisor or his representative to inspect or investigate the underground and surface conditions; to conduct surveys; to estimate the amount of ore or mineral product mined; to study the methods of prospecting, exploration, testing, development, processing, and handling that are followed; to determine the volumes, types, and composition of wastes generated, the adequacy of measures for minimizing the amount of such wastes, and the measures for treatment and disposal of such wastes; and to determine whether the terms and conditions of the permit or lease and the requirements of the exploration or mining plan have been complied with.

§ 231.71 Issuance of orders.

Before beginning operations the operator shall inform the mining supervisor in writing of the designation and post office address of the exploration or mining operation, the operator's temporary and permanent post office address, and the name and post office address of the superintendent or other agent who will be in charge of the operations and who will act as the local representative of the operator. The mining supervisor shall also be informed of each change thereafter in the address of the mine office or in the name or address of the local representative.

§ 231.72 Service of notices, instructions, and orders.

The operator shall be considered to have received all notices, instructions, and orders that are mailed to or posted at the mine or mine office, or mailed or handed to the superintendent, the mine foreman, the mine clerk, or higher officials connected with the mine, for transmittal to the operator or his local representative.

§ 231.73 Enforcement of orders.

(a) If the mining supervisor determines that an operator has failed to comply with the regulations in this part, other applicable departmental regulation, the terms and conditions of the permit or lease, the requirements of an approved exploration or mining plan, or with the mining supervisor's orders or instructions, and such noncompliance does not threaten immediate, serious, or irreparable damage to the environment, the mine or the deposit being mined, or other valuable mineral deposits or other resources, the mining supervisor shall serve a notice of noncompliance upon the operator by delivery in person to him or his agent or by certified or registered mail addressed to the operator at his last known address. Failure of the operator to take action in accordance with the notice of noncompliance shall be grounds for suspension by the mining supervisor of operations.

(b) A notice of noncompliance shall specify in what respects the operator has failed to comply with the provisions of applicable regulations, the terms and conditions of the permit or lease, the requirements of an approved exploration or mining plan or the orders and instructions of the mining supervisor, and shall specify the action which must be taken to correct the noncompliance and the time limits within which such action must be taken.

(c) If in the judgment of the mining supervisor such failure to comply with the regulations, the terms and conditions of the permit or lease, the requirements of approved exploration or mining plans, or with the mining supervisor's orders or instructions threatens immediate, serious, or irreparable damage to the environment, the mine or the deposit being mined, or other valuable mineral deposits or other resources, the mining supervisor is authorized, either in writing or orally with written confirmation, to suspend operations without prior notice.

§ 231.74 Appeals.

(a) A party adversely affected by an order of the mining supervisor made pursuant to the provisions of this part shall have a right to appeal to the Director and the further right to appeal to the Board of Land Appeals in the Office of Hearings and Appeals, Office of the Secretary, from an adverse decision of the Director, unless such decision was approved by the Secretary prior to promulgation.

(b) An appeal to the Director may be taken by filing a notice of appeal with the mining supervisor within 30 days from service of the mining supervisor's order. The notice of appeal shall incorporate or be accompanied by such written showing and argument on the facts and laws as the appellant may deem adequate to justify reversal or modification of the order. Within the same 30-day period, the appellant will be permitted to file with the mining supervisor additional statements of reasons and written arguments or briefs.

(c) The mining supervisor shall transmit the appeal and accompanying papers to the Director who will review the record and render such a decision in the case as he deems proper.

(d) Appeals to the Board of Land Appeals shall be made pursuant to procedures outlined in 43 CFR Part 4, Department Hearings and Appeals Procedures.

(e) Oral argument in any case pending before the Director will be allowed on motion in the discretion of such officer and at a time to be fixed by him.

(f) The procedure for appeals under this part shall be followed for permits and leases on Indian land except that with respect to such permits and leases, the Commissioner of Indian Affairs will exercise the functions vested in the Director. A party adversely affected by a decision of the Commissioner of Indian Affairs under this part shall have a right of appeal to the Board of Land Appeals in the Office of Hearings and Appeals, Office of the Secretary, in accordance with the procedures provided in this section.

(g) With the exception of the time fixed for filing a notice of appeal, the time for filing any document in connection with an appeal may be extended by the officer to whom the appeal is taken. A request for an extension of time must be filed within the time allowed for the filing of the document and must be filed in the same office in which the document in connection with which the extension is requested must be filed.

Cross Reference: See 43 CFR 23.12 for appeals under 43 CFR Part 23—Surface Exploration, Mining, and Reclamation of Lands. See 25 CFR 177.11 for appeals under 25 CFR Part 177—Surface Exploration, Mining, and Reclamation of Lands.

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§ 23.5, the provisions of the regulations in this part, and the terms of the permit.

(c) The operator shall comply with the provisions of an approved exploration plan. The mining supervisor and the district manager may, with respect to such a plan, exercise the authority provided by paragraphs (f) and (g) of § 23.8 respecting a mining plan.

§ 23.8 Approval of mining plan.

(a) (1) Before surface mining operations may commence under any permit or lease issued under the mineral leasing acts the operator must file a mining plan with the mining supervisor and obtain his approval of the plan. Paragraphs (b) through (g) of this section confer authority upon mining supervisors with respect to mining plans pertaining to permits or leases issued under the mineral leasing acts. The mining supervisor shall consult with the district manager with respect to the surface protection and reclamation aspects before approving said plan.

(2) Before surface mining operations may commence under any permit issued or contract made under the Materials Act, the operator must file a mining plan with the district manager and obtain his approval of the plan. Paragraphs (b) through (g) of this section confer authority upon district managers with respect to mining plans pertaining to permits issued or contracts made under the Materials Act.

(b) Depending on the size and nature of the operation and the requirements established pursuant to § 23.5, the mining supervisor or the district manager may require that the mining plan submitted by the operator include any or all of the following:

(1) A description of the location and area to be affected by the operations;

(2) Two copies of a suitable map, or aerial photograph showing the topography, the area covered by the permit, lease, or contract, the name and location of major topographic and cultural features, and the drainage plan away from the area to be affected;

(3) A statement of proposed methods of operating, including a description of proposed roads or vehicular trails; the size and location of structures and facilities to be built;

(4) An estimate of the quantity of water to be used and pollutants that are expected to enter any receiving waters;

(5) A design for the necessary impoundment, treatment or control of all runoff water and drainage from workings so as to reduce soil erosion and sedimentation and to prevent the pollution of receiving waters;

(6) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, damage to fish and wildlife, and hazards to public health and safety; and

(7) A statement of the proposed manner and time of performance of work to reclaim areas disturbed by the holder's operation.

(c) In those instances in which the permit, lease, or contract requires the revegetation of an area of land to be affected the mining plan shall show:

(1) Proposed methods of preparation and fertilizing the soil prior to replanting;

(2) Types and mixtures of shrubs, trees, or tree seedlings, grasses or legumes to be planted; and

(3) Types and methods of planting, including the amount of grasses or legumes per acre, or the number and spacing of trees, or tree seedlings, or combinations of grasses and trees.

(d) In those instances in which the permit, lease, or contract requires regrading and backfilling, the mining plan shall show the proposed methods and the timing of grading and backfilling of areas to be affected by the operation.

(e) The mining supervisor or the district manager shall review the mining plan submitted to him by the operator and shall promptly indicate to the operator any changes, additions, or amendments necessary to meet the requirements formulated pursuant to § 23.5, the provisions of the regulations in this part and the terms of the permit, lease, or contract. The operator shall comply with the provisions of an approved mining plan.

(f) A mining plan may be changed by mutual consent of the mining supervisor or the district manager and the operator at any time to adjust to changed conditions or to correct any oversight. To obtain approval of a change or supplemental plan the operator shall submit a written statement of the proposed changes or supplement and the justification for the changes proposed. The mining supervisor or the district manager shall promptly notify the operator that he consents to the proposed changes or supplement or, in the event he does not consent, he shall specify the modifications thereto under which the proposed changes or supplement would be acceptable. After mutual acceptance of a change of a plan the operator shall not depart therefrom without further approval.

(g) If circumstances warrant, or if development of a mining plan for the entire operation is dependent upon unknown factors which cannot or will not be determined except during the progress of the operations, a partial plan may be approved and supplemented from time to time. The operator shall not, however, perform any operation except under an approved plan.

§ 23.9 Performance bond.

(a) (1) Upon approval of an exploration plan or mining plan, the operator shall be required to file a suitable performance bond of not less than $2,000 with satisfactory surety, payable to the Secretary of the Interior, and the bond shall be conditioned upon the faithful compliance with applicable regulations, the terms and conditions of the permit, lease, or contract, and the exploration or mining plan as approved, amended

or supplemented. The bond shall be in an amount sufficient to satisfy the reclamation requirements of an approved exploration or mining plan, or an approved partial or supplemental plan. In determining the amount of the bond consideration shall be given to the character and nature of the reclamation requirements and the estimated costs of reclamation in the event that the operator forfeits his performance bond.

(2) In lieu of a performance bond an operator may elect to deposit cash or negotiable bonds of the U.S. Government. The cash deposit or the market value of such securities shall be equal at least to the required sum of the bond.

(b) A bond may be a nationwide or statewide bond which the operator has filed with the Department under the provisions of the applicable leasing regulations in Subchapter C of Chapter II of this title, if the terms and conditions thereof are sufficient to comply with the regulations in this part.

(c) The district manager shall set the amount of a bond and take the necessary action for an increase or for a complete or partial release of a bond. He shall take action with respect to bonds for leases or permits only after consultation with the mining supervisor.

§ 23.10 Reports: Inspection.

(a) (1) The holder of a permit or lease under the mineral leasing acts shall file the reports required by this section with the mining supervisor. The holder of a permit or a party to a contract under the Materials Act shall file such reports with the district manager.

(2) The provisions of this section confer authority and impose duties upon mining supervisors with respect to permits or leases issued under the mineral leasing acts and upon district managers with respect to permits issued or contracts made under the Materials Act.

(b) Operations report: Within 30 days after the end of each calendar year, or if operations cease before the end of a calendar year, within 30 days after the cessation of operations, the operator shall submit an operations report containing the following information:

(1) An identification of the permit, lease, or contract and the location of the operation;

(2) A description of the operations performed during the period of time for which the report is filed;

(3) An identification of the area of land affected by the operations and a description of the manner in which the land has been affected;

(4) A statement as to the number of acres disturbed by the operations and the number of acres which were reclaimed during the period of time;

(5) A description of the method utilized for reclamation and the results thereof;

(6) A statement and description of reclamation work remaining to be done.

(c) Grading and backfilling report: Upon completion of such grading and backfilling as may be required by an approved exploration or mining plan, the operator shall make a report thereon and request inspection for approval. Whenever it is determined by such inspection that backfilling and grading has been carried out in accordance with the established requirements and approved exploration or mining plan, the district manager shall issue a release of an appropriate amount of the performance bond for the area graded and backfilled. Appropriate amounts of the bond shall be retained to assure that satisfactory planting, if required, is carried out.

(d) Planting report: (1) Whenever planting is required by an approved exploration or mining plan, the operator shall file a report with the mining supervisor or district manager whenever such planting is completed. The report shall—

(i) Identify the permit, lease, or contract;

(ii) Show the type of planting or seeding, including mixtures and amounts;

(iii) Show the date of planting or seeding;

(iv) Identify or describe the areas of the lands which have been planted;

(v) Contain such other information as may be relevant.

(2) The mining supervisor or district manager, as soon as possible after the completion of the first full growing season, shall make an inspection and evaluation of the vegetative cover and planting to determine if a satisfactory growth has been established.

(3) If it is determined that a satisfactory vegetative cover has been established and is likely to continue to grow, any remaining portion of the performance bond may be released if all requirements have been met by the operator.

(e) Report of cessation or abandonment of operations: (1) Not less than 30 days prior to cessation or abandonment of operations, the operator shall report his intention to cease or abandon operations, together with a statement of the exact number of acres of land affected by his operations, the extent of reclamation accomplished and other relevant information.

(2) (i) Upon receipt of such report the mining supervisor or the district manager shall make an inspection to determine whether operations have been carried out and completed in accordance with the approved exploration or mining plan.

(ii) Whenever the lands in a permit, lease or contract issued under the mineral leasing acts or the Materials Act are under the jurisdiction of a bureau of the Department of the Interior other than the Bureau of Land Management the mining supervisor or the district manager, as appropriate, shall obtain the concurrence of the authorized officer of such bureau that the operation has been carried out and completed in accordance with the approved exploration or mining plan with respect to the surface protection and reclamation aspects of such plan before releasing the performance bond.

(iii) Whenever the lands in a permit, lease or contract issued under the Mineral Leasing Act of 1920 or the Materials Act are under the jurisdiction of an agency other than the Department of the Interior, the mining supervisor or the district manager, as appropriate, shall consult representatives of the agency administering the lands and obtain their recommendations as to whether the operation has been carried out and completed in accordance with the approved exploration or mining plan, with respect

to the surface protection and reclamation aspects of such plan before releasing the performance bond. If the mining supervisor or district manager, as appropriate, do not concur in the recommendations of the agency regarding compliance with the surface protection and reclamation aspects of the approved exploration or mining plan, the issues shall be referred for resolution to the Under Secretary of the Department of the Interior and the comparable officer of the agency submitting the recommendations. In the case of disagreement on issues which are so referred, the Secretary of the Interior shall make a determination which shall be final and binding. In cases in which the recommendations are not concurred in by the mining supervisor or district manager, the performance bond shall not be released until resolution of the issues or until a final determination by the Secretary of the Interior.

(iv) Whenever the lands in a permit or lease issued under the Mineral Leasing Act for Acquired Lands are under the jurisdiction of an agency other than the Department of the Interior, the mining supervisor or the district manager, as appropriate, shall obtain the concurrence of the authorized officer of such agency that the operation has been carried out and completed in accordance with the approved exploration or mining plan with respect to the surface protection and reclamation aspects of such plan before releasing the performance bond.

§ 23.11 Notice of noncompliance: Revocation.

(a) The provisions of this section confer authority and impose duties upon mining supervisors with respect to permits or leases issued under the mineral leasing acts and upon district managers with respect to permits issued or contracts made under the Materials Act. The mining supervisor shall consult with the district manager before taking any action under this section.

(b) The mining supervisor or district manager shall have the right to enter upon the lands under a permit, lease, or contract, at any reasonable time, for the purpose of inspection or investigation to determine whether the terms and conditions of the permit, lease, or contract, and the requirements of the exploration or mining plan have been complied with.

(c) If the mining supervisor or the district manager determines that an operator has failed to comply with the terms and conditions of a permit, lease, or contract, or with the requirements of an exploration or mining plan, or with the provisions of applicable regulations under this part the supervisor or manager shall serve a notice of noncompliance upon the operator by delivery in person to him or his agent or by certified or registered mail addressed to the operator at his last known address.

(d) A notice of noncompliance shall specify in what respects the operator has failed to comply with the terms and conditions of a permit, lease, or contract, or the requirements of an exploration or mining plan, or the provisions of applicable regulations, and shall specify the action which must be taken to correct the noncompliance and the time limits within which such action must be taken.

(e) Failure of the operator to take action in accordance with the notice of noncompliance shall be grounds for suspension by the mining supervisor or the district manager of operations or for the initiation of action for the cancellation of the permit, lease, or contract and for forfeiture of the performance bond required under § 23.9.

§ 23.12 Appeals.

(a) A person adversely affected by a decision or order of a district manager or of a mining supervisor made pursuant to the provisions of this part shall have a right of appeal to the Director of the Bureau of Land Management whenever the decision appealed from was rendered by a district manager, or to the Director of the Geological Survey if the decision or order appealed from was rendered by a mining supervisor, and the further right to appeal to the Secretary of the Interior from an adverse decision of either Director unless such decison was approved by the Secretary prior to promulgation.

(b) Appeals to Director, Bureau of Land Management, or to Director, Geological Survey, and appeals to the Secretary shall be made pursuant to procedures and requirements of Parts 1840 and 1850 of this title, except that for the purposes of an appeal taken from a decision or order of a mining supervisor made pursuant to this part:

(1) The term "Director" wherever it occurs in Part 1850 or 1850 of this title shall mean the Director of the Geological Survey.

(2) The term "Field Commissioner" shall include a person designated by the Director of the Geological Survey to hold a hearing.

(3) Whenever the provisions of Parts 1840 and 1850 of this title require that a document be filed in the Office of the Director, such documents shall be filed in the Office of the Director, Geological Survey (Address: Director, Geological Survey, Washington, D.C. 20240).

(c) In any case involving a permit, lease or contract for lands under the jurisdiction of an agency other than the Department of the Interior, or a bureau of the Department of the Interior other than the Bureau of Land Management, the officer rendering a decision or order shall, in the event of an appeal from such decision or order, designate the authorized officer of such agency as an adverse party on whom a copy of a notice of appeal and any statement of reasons, written arguments or briefs must be served.

(d) Hearings to present evidence on an issue of fact before a Field Commissioner designated by the appropriate Director shall be conducted pursuant to the requirements and procedures set forth in Part 1850 of this title.

§ 23.13 Consultation.

Whenever the lands included in a permit, lease, or contract are under the jurisdiction of an agency other than the Department of the Interior or under the jurisdiction of a bureau of the Department of the Interior other than the Bureau of Land Management, the mining supervisor or the district manager, as appropriate, shall consult the authorized officer of such agency before taking any final action under §§ 23.7, 23.8, 23.10 (c) and (d) (2) and (3), and 23.11(c).

DAVID S. BLACK,
Under Secretary of the Interior.

JANUARY 15, 1969.

[F.R. Doc. 69-747; Filed, Jan. 17, 1969; 8:51 a.m.]

Title 30—MINERAL RESOURCES

Chapter II—Geological Survey, Department of the Interior

PART 231—OPERATING REGULATIONS FOR EXPLORATION, DEVELOPMENT; AND PRODUCTION

On March 24, 1971, a notice and text of a proposed revision of the mining operating regulations, governing operations conducted under mineral permits and leases on public and acquired lands of the United States and Indian lands administered by the Department of the Interior, was published in the FEDERAL REGISTER (36 F.R. 5510-5515) for the following purposes:

(1) To update the existing regulations by deleting obsolete provisions and including requirements consistent with modern mining practices;

(2) To add provisions for the protection of the environment during exploratory and mining operations and for reclamation of lands disturbed by such operations;

(3) To revise the procedure for appeals from decisions of the Mining Supervisors; and

(4) To delete provisions pertaining to health and safety of miners since health and safety standards for metal and nonmetallic mines are now contained in 30 CFR Parts 55, 56, and 57.

Interested parties were given 60 days from the date of publication of the notice within which to submit written comments, suggestions, or objections with respect to the proposed revision. The period for submitting written comments, suggestions, or objections was subsequently extended to July 22, 1971, by a notice published in the FEDERAL REGISTER on June 19, 1971 (36 F.R. 11815). After consideration of the views presented, the following changes have been made in the proposed regulations:

1. In § 231.1, the term "oil shale" has been corrected to read "shale oil" when referring to the extraction of shale oil by in situ methods from oil shale.

2. Section 231.2 has been amended to eliminate the definition of "Chief, Branch of Mining Operations" and to change the definition of "Mining Supervisor." These amendments have been made to reflect the recently approved reorganization of the Conservation Division of the Geological Survey. (Departmental Manual Part 120, Chapter 4; Release No. 1373, December 8, 1971.) For the same reason, the title, "Chief, Branch of Mining Operations" has been deleted in paragraph (a) of § 231.3, and in paragraphs (c) (3) and (4) of that section, the title "Chief, Conservation Division of the Geological Survey" has been substituted for the title "Chief, Branch of Mining Operations."

3. In § 231.3, the provision in paragraph (d) authorizing the Mining Supervisor to consult with or solicit and receive advice of the Environmental Protection Agency pertaining to water pollution problems has been deleted since such matters are more appropriately the subject of a memorandum of understanding between this Department and the Environmental Protection Agency. For the same reason, the provisions in paragraph (e) of this section and in paragraph (d) of § 231.4 with respect to consultation by the Mining Supervisor with the Environmental Protection Agency have been deleted. Paragraph (e) of § 231.3 has been amended to provide that the Mining Supervisor in addition to making inspections to determine the adequacy of water pollution control measures shall also make inspections to determine the adequacy of air pollution control measures.

4. Section 231.4 has been changed to make it clear that a lessee's or permittee's obligation, under paragraph (b), pertaining to damage to the environment, surface improvements, and other values is to "avoid, minimize or repair" such damage, and that determination made by the mining supervisor under paragraph (b) will be subject to appeal. Paragraph (c) has been amended to provide that all operations under the regulations shall be consistent with both Federal and State water and air quality standards.

5. Section 231.10(a) has been changed to require that exploration and mining plans be submitted in quintuplicate rather than in triplicate. This change is necessary to assure that the mining supervisor receives sufficient copies of the plans to permit distribution to other interested agencies.

6. In § 231.10(b), which enumerates the items which the mining supervisor may require be included in an exploration plan, the first 17 words: "Depending on the size and nature of the operations and terms and conditions of the permit • • • ," have been deleted as unnecessary since the authority granted to the mining supervisor to require inclusion of the enumerated item is discretionary. For the same reason, the first 17 words, "Depending on the size and nature of the operation and the terms and conditions of the lease • • •" have been deleted from paragraph (c) of this section which enumerates the items which the mining supervisor may require be included in mining plans. Also, the title of paragraphs (b) and (c) have been changed from "Permits" and "Lease" respectively, to the more descriptive titles, "Exploration Plans" and "Mining Plans." The number of maps or aerial photographs that may be required with exploration and mining plans has been increased from two to five because of the need by the mining supervisor and other interested agencies for additional copies of these items.

7. The requirement of § 231.11 that copies of maps of underground workings and surface operations be submitted on "tracing cloth" has been changed to require that such maps be submitted on "reproducible material." Copies of maps on reproducible material will be adequate for the Mining Supervisor's needs. In the requirement that the accuracy of maps furnished to the Mining Supervisor be certified "by a professional engineer, professional land surveyor, or other qualified person", the word "professionally" has been added between the words "other" and "qualified" to make it clear that the accuracy of such maps shall be certified only by those who are professionally qualified to do so.

8. The requirement of § 231.20(a) that all drill holes be logged "by competent geologists or engineers" has been changed to require that drill holes be logged "under supervision of a competent geologist or engineer." The changed requirement is considered to afford adequate protection to the United States and is consistent with present drilling practices. Section 231.20(a) also has been amended to place a limitation of 1 year on the period an operator is required to retain the core from test holes for inspection since retention for a longer period puts an unnecessary burden on the operator.

9. Section 231.20(b) has been changed to make it clear that drill holes shall be "cemented, and/or cased" when abandoned, unless other methods of abandonment are approved in advance by the Mining Supervisor.

10. Section 231.20(d) has been changed to make the requirement for equipping drilling equipment with blowout preventers when drilling on lands valuable or potentially valuable for geothermal resources applicable also when drilling on land valuable or potentially valuable for oil and gas since the danger of blowouts exists in both situations.

11. In the requirement of § 231.30 that operators observe the highest standards while conducting mining operations, the term "good practice following the highest standards" has been substituted for the term "the highest standards." Section 231.30, as originally proposed, amended former § 231.12 by substituting "highest standards" for the term "good practice." It was not the purpose of that change to place on an operator any additional obligations to those required in the former regulation. The present change is being made to make it clear that the requirement that an operator observe "good practice" means that he shall follow the highest standards prevailing in the mining industry.

12. Since pillars may not be the only acceptable method for protection of mine workings and overlying deposits, § 231.31 has been amended to authorize the Mining Supervisor to approve other methods for providing such protection.

13. Section 231.34 has been changed by adding the word "underground" in the first sentence to make it clear that this section, which provides for development of leased lands from a mine on adjoining lands, applies only to underground mines on adjoining lands and not to surface mines. The requirement of paragraph (c) for providing free access for inspection of connecting mines on privately owned or controlled lands "at all hours" has been changed to the more reasonable requirement that such access be provided at "any reasonable time."

14. The requirement of § 231.34 that structures within 100 feet of a mine opening be protected against fire has been changed to add the additional requirement that they be constructed of fire resistent material. This change will add a higher degree of safety and is consistent with a similar requirement in 30 CFR Part 57.

15. Section 231.73 *Enforcement of orders*, has been rewritten to require that the Mining Supervisor serve notice on the operator before suspending operations for failure to comply with regulations, terms, and conditions of the permit or lease, the requirements of approved plans, and instructions of the Supervisor. Such advance notice, however, would not be required if the violation threaten immediate, serious or irreparable harm to the environment, mine, or other resources.

16. Section 231.74 has been changed in several respects for the purpose of clarifying the procedure for appeals from orders of the Mining Supervisor. The section has been amended to provide that appeals from a decision of the Director, Geological Survey, or the Commissioner of Indian Affairs under 30 CFR Part 231, may be taken to the Board of Land Appeals in accordance with the Department hearings and appeals procedures in 43 CFR Part 4.

Other suggestions for changes in the proposed regulations were considered but were not adopted.

Effective date. The amended regulations are hereby adopted to take effect at the beginning of the 30th calendar day following the date of publication in the FEDERAL REGISTER.

Dated: May 26, 1972.

W. T. PECORA,
Acting Secretary of the Interior.

ADMINISTRATION OF REGULATIONS AND DEFINITIONS

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231.40 Surface openings.
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231.50 Milling.
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INSPECTION, ISSUANCE OF ORDERS AND ENFORCEMENT OF ORDERS

231.70 Inspection of underground and surface conditions; surveying, estimating, and study.
231.71 Issuance of orders.
231.72 Service of notices, instructions, and orders.
231.73 Enforcement of orders.
231.74 Appeals.

AUTHORITY: The provisions of this Part 231 issued under 35 Stat. 312; 35 Stat. 781, as amended; secs. 32, 6, 26, 41 Stat. 450, 753, 1248; secs. 1, 2, 3, 44 Stat. 301, as amended; secs. 6, 3, 44 Stat. 659, 710; secs. 1, 2, 3, 44 Stat. 1057; 47 Stat. 1487; 49 Stat. 1482, 1250, 1967, 2026; 52 Stat. 347; sec. 10, 53 Stat. 1196, as amended; 56 Stat. 273; sec. 10, 61 Stat. 915; sec. 3, 63 Stat. 683; 64 Stat. 311; 25 U.S.C. 396, 396a–f, 30 U.S.C 189, 271, 281, 293, 359. Interpret or apply secs. 5, 5, 44 Stat. 302, 1058, as amended; 58 Stat. 483–485; 5 U.S.C. 301, 16 U.S.C. 508b, 30 U.S.C. 189, 192c, 271, 281, 293, 359, 43 U.S.C. 387.

ADMINISTRATION OF REGULATIONS AND DEFINITIONS

§ 231.1 Scope and purpose.

(a) The regulations in this part shall govern operations for the discovery, testing, development, mining, and processing of potash, sodium, phosphate, sulphur, asphalt, and oil shale (except for operations for the extraction of shale oil by in situ retorting methods utilizing boreholes or wells) under leases or permits issued for public domain lands pursuant to the regulations in 43 CFR Group 3500. These regulations shall also apply to operations for the discovery, testing, development, mining, and processing of minerals (except coal, oil, and gas) in acquired lands under leases or permits issued pursuant to the regulations in 43 CFR Group 3500 and minerals (except coal, oil, and gas) in tribal and allotted Indian lands leased under the regulations in 25 CFR Parts 171, 172, 173, 174, and 176.

(b) The purpose of the regulations in this part is to promote orderly and efficient prospecting, exploration, testing, development, mining, and processing operations and production practices without waste or avoidable loss of minerals or damage to deposits; to promote the safety, health, and welfare of workmen; to encourage maximum recovery and use of all known mineral resources; to promote operating practices which will avoid, minimize, or correct damage to the environment—land, water and air—and avoid, minimize, or correct hazards to public health and safety; and to obtain a proper record and accounting of all minerals produced.

(c) When the regulations in this part relate to matters included in the regulations in 43 CFR Part 23—Surface Exploration, Mining, and Reclamation of Lands—pertaining to public domain and acquired lands, or 25 CFR Part 177—Surface Exploration, Mining, and Reclamation of Lands—pertaining to Indian lands, the regulations in this part shall be considered as supplemental to the regulations in those parts, and the regulations in those parts shall govern to the extent of any inconsistencies.

CROSS REFERENCE: See Part 211 of this chapter for regulations governing operations under coal permits and leases. See Part 221 of this chapter for regulations governing operations under oil and gas leases and operations for the extraction of shale oil by in situ retorting or other methods utilizing boreholes or wells.

§ 231.2 Definitions.

The terms used in this part shall have the following meanings:

(a) *Secretary.* The Secretary of the Interior.

(b) *Director.* The Director of the Geological Survey, Washington, D.C.

(c) *Mining supervisor.* A registered professional engineer; the representative of the Secretary under administrative direction of the Director through the Chief, Conservation Division, and appropriate Regional Manager, Conservation Division of the Geological Survey, authorized and empowered to regulate operations and to perform other duties prescribed in the regulations in this part, or any subordinate of the Mining Supervisor acting under his direction.

(d) *Lessee.* Any person or persons, partnership, association, corporation, or municipality to whom a mineral lease is issued subject to the regulations in this part, or an assignee of such lease under an approved assignment.

(e) *Permittee.* Any person or persons, partnership, association, corporation, or municipality to whom a mineral prospecting permit is issued subject to the regulations in this part, or an assignee of such permit under an approved assignment.

(f) *Leased lands, leased premises, or leased tract.* Any lands or deposits under a mineral lease and subject to the regulations in this part.

(g) *Permit lands.* Any lands or deposit under a mineral prospecting permit and subject to the regulations in this part.

(h) *Operator.* A lessee or permittee or one conducting operations on the leased or permit lands under the authority of the lessee or permittee.

(i) *Reclamation.* The measures undertaken to bring about the necessary reconditioning or restoration of land or water that has been affected by exploration, testing, mineral development, mining, onsite processing operations, or waste disposal, in ways which will prevent or control onsite and offsite damage to the environment.

§ 231.3 Responsibilities.

(a) Subject to the supervisory authority of the Secretary, the regulations in this part shall be administered by the Director through the Chief, Conservation Division, of the Geological Survey.

(b) The responsibility for health and safety inspections of mines subject to the regulations in this part is vested in the Bureau of Mines in accordance with section 4 of the Federal Metal and Nonmetallic Mine Safety Act (80 Stat. 772, 773; 30 U.S.C. 723) and the Health and Safety Standards contained in Parts 55, 56, and 57, Chapter I, of this title.

(c) The mining supervisor, individually, or through his subordinates is empowered to regulate prospecting, exploration, testing, development, mining, and processing operations under the regulations in this part. The duties of the mining supervisor or his subordinates include the following:

(1) *Inspections; supervision of operations to prevent waste or damage.* Examine frequently leased or permit lands where operations for the discovery, testing, development, mining, or processing of minerals are conducted or are to be conducted; inspect and regulate such operations, including operations at accessory plants, for the purpose of preventing waste of mineral substances or damage to formations and deposits containing them, or damage to other formations, deposits, or nonmineral resources affected by the operations, and insuring that the terms and conditions of the permit or lease and the requirements of the exploration or mining plans are being complied with.

(2) *Compliance with regulations, lease or permit terms, and approved plans.* Require operators to conduct their operations in compliance with the provisions of applicable regulations, the terms and conditions of the leases or permits, and the requirements of approved exploration or mining plans.

(3) *Reports on condition of lands and manner of operations; recommendations for protection of property.* Make reports to the Chief, Conservation Division of the Geological Survey, as to the general condition of lands under permit or lease and the manner in which operations are being conducted and orders or instructions are being complied with, and to submit information and recommendations for protecting the minerals, the mineral-bearing formations and the nonmineral resources.

(4) *Manner and form of records, reports, and notices.* Prescribe, subject to the aproval of the Chief, Conservation Division of the Geological Survey, the manner and form in which records of operations, reports, and notices shall be made.

(5) *Records of production; rentals and royalties.* Obtain and check the records of production of minerals; determine rental and royalty liability of lessees and permittees; collect and deposit rental and royalty payments; and maintain rental and royalty accounts.

(6) *Suspension of operations and production.* Act on applications for suspension of operations or production or both filed pursuant to 43 CFR 3503.3-2(e), and terminate such suspensions which have been granted; and transmit to the Bureau of Indian Affairs for appropriate action applications for suspension of operations or production or both under leases on Indian lands.

(7) *Cessation and abandonment of operations.* Upon receipt of a report of cessation or abandonment of operations, inspect and determine whether the terms and conditions of the permit or lease and the exploration or mining plans have been complied with; and determine and report to the agency having administrative jurisdiction over the lands when the lands have been properly conditioned for abandonment. The mining supervisor, in accordance with applicable regulations, will consult with, or obtain the concurrence of, the authorized officer of the agency having administrative jurisdiction over the lands with respect to compliance by the operator with the surface protection and reclamation requirements of the lease or permit and the exploration or mining plan.

(8) *Trespass involving removal of mineral deposits.* Report to the agency having administrative jurisdiction over the lands any trespass that involves removal of mineral deposits.

(d) Prior to the approval of an exploration or mining plan, the mining supervisor shall consult with the authorized officer of the agency having administrative jurisdiction over the lands with repect to the surface protection and reclamation aspects of the plan.

(e) The mining supervisor shall inspect exploratory and mining operations to determine the adequacy of water management and pollution control measures for the protection and control of the quality of surface and ground water resources and the adequacy of emission control measures for the protection and control of air quality.

(f) The mining supervisor shall issue such orders and instructions not in conflict with the laws of the State in which the leased or permit lands are situated as necessary to assure compliance with the purposes of the regulations in this part.

§ 231.4 General obligations of lessees and permittees.

(a) Operations for the discovery, testing, development, mining, or processing of minerals shall conform to the provisions of applicable regulations, the terms and conditions of the lease or permit, the requirements of approved exploration or mining plans, and the orders and instructions issued by the mining supervisor or his subordinates under the regulations in this part. Lessees and permittees shall take precautions to prevent waste and damage to mineral-bearing formations, and shall take such steps as may be needed to prevent injury to life or health and to provide for the health and welfare of employees.

(b) Lessees and permittees shall take such action as may be needed to avoid, minimize, or repair soil erosion; pollution of air; pollution of surface or ground water; damage to vegetative growth, crops, including privately owned forage, or timber; injury or destruction of fish and wildlife and their habitat; creation of unsafe or hazardous conditions; and damage to improvements, whether owned by the United States, its permittees, licensees or lessees, or by others; and damage to recreational, scenic, historical, and ecological values of the land. The surface of leased or permit lands shall be reclaimed in accordance with the terms and conditions prescribed in the lease or permit and the provisions of the approved exploration or mining plan. Where any question arises as to the necessity for or the adequacy of an action to meet the requirements of this paragraph, the determination of the mining supervisor shall be final, subject to the right of appeal as provided in § 231.74.

(c) All operations conducted under the regulations in this part must be consistent with Federal and State water and air quality standards.

(d) When the mining supervisor determines that a water pollution problem exists, the mining supervisor may require that a lessee or permittee maintain records of the use of water, quantity and quality of waste water produced, and the quantity and quality of waste water disposal, including mine drainage discharge, process wastes and associated wastes. In order to obtain this information, the lessee or permittee may be required to install a suitable monitoring system.

(e) Full reports of accidents, inundations, or fires shall be promptly mailed to the mining supervisor by the operator or his representative. Fatal accidents, accidents threatening damage to the mine, the lands, or the deposits, or accidents which could cause water pollution shall be reported promptly to the mining supervisor by telegram or telephone. The reports required by this section shall be in addition to those required by Parts 55, 56, or 57, Chapter I of this title or other applicable regulations.

(f) Lessees and permittees shall submit the reports required by 25 CFR Part 177; Part 200 of this chapter, and 43 CFR Part 23.

§ 231.5 Public inspection of records.

Geological and geophysical interpretations, maps, and data and commercial and financial information required to be submitted under this part shall not be available for public inspection without the consent of the permittee or lessee so long as the permittee or lessee furnishing such data, or his successors or assignees, continues to hold a permit or lease of the lands involved.

Maps and Plans

§ 231.10 Operating plans.

(a) *General.* Before conducting any operations under a permit or lease, the operator shall submit, in quintuplicate, to the mining supervisor for approval an exploration or mining plan which shall show in detail the proposed exploration, prospecting, testing, development, or mining operations to be conducted. Ex-

APPENDIX I-9

RECOMMENDED ENVIRONMENTAL MONITORING PROGRAMS FOR

- AIR
- WATER
- BIOLOGY

AIR QUALITY MONITORING

GENERAL

The air quality monitoring system utilized in the area of oil shale development will have as its purpose:

(1) Monitoring of background, predevelopment ambient concentrations,

(2) Monitoring of ambient concentrations during area development, and

(3) Monitoring of ambient concentrations during operation.

The parameters of interest will be those outlined specifically by the lease, those for which standards have been set by either Federal, State or local governments and those which have a potential for environmental degradation.

With passage of the Clean Air Amendments of 1970, States were required to meet the National Ambient Air Quality Standards for 1975 by promulgation and enforcement of emission regulations. Emission regulations vary from State to State as well as from municipality to municipality. The degree of control required in an area may not be the same as that required in another area because of the existing air quality and the number and type of pollution sources. In some States, stringent emission regulations have been promulgated and enforced, which could restrict certain types of commercial or industrial expansion.

To comply with the Environmental Protection Agency's requirements, the States had to determine the degree of control required, by measuring the existing ambient air quality and determining the amount of reduction necessary to achieve the ambient air quality standards.

By January 30, 1972, each State had submitted to EPA an implementation plan for achieving the National Ambient Air Quality Standards by 1975. The implementation plans included the emission standards which were deemed necessary to achieve the selected ambient air quality goals.

A summary of the Federal ambient air quality standards for particulates, sulfur dioxide, nitrogen oxides, carbon monoxide, photochemical oxidants, and hydrocarbons appears in Table 1.

GENERAL

TABLE 1

NATIONAL AMBIENT AIR QUALITY STANDARDS

	Primary Standard[1]		Secondary Standard[2]	
	$\mu g/m^3$	ppm	$\mu g/m^3$	ppm
Sulfur oxides -				
annual arithmetic mean	80	0.030	60	0.021
24-hour concentration	365[3]	0.137	260[3]	0.091[3]
Particulate matter -				
annual geometric mean	75		60	
24-hour concentration	260[3]		150[3]	
Carbon monoxide -				
8-hour concentration (mg)	10[3]		Same as Primary	
1-hour concentration	40[3]			
Photochemical oxidants -				
1-hour concentration	160[3]	0.08[3]	Same as Primary	
Hydrocarbons -				
(corrected for methane)				
3-hour concentration (6-9am)	160[3]	0.24[3]	Same as Primary	
Nitrogen oxides -				
annual arithmetic mean	100	0.053	Same as Primary	

1/ Primary Standards: Maximum permissible concentration to protect human health.

2/ Secondary Standards: Maximum permissible concentration to protect plants and wildlife.

3/ Not to be exceeded more than once a year.

A summary of ambient air quality standards adopted by Colorado, Utah, and Wyoming is given in Table 2. More specific data for the State of Colorado is given in Table 3. It will be noted from a comparison of the State and Federal Standards that concentrations, averaging times, and methods of calculations vary somewhat. In addition, because of the variation in existing ambient air quality, between the three States and the desire to maintain high air quality, different emission standards have been adopted by each of these States that will apply to future oil shale processing facilities. In instances where State standards have not been set, or where State standards are less stringent than national standards (for example, Utah's standard for particulates), the national standards will take precedence.

Determining what constitutes "significant deterioration" of air quality and exactly how it can be prevented has recently become a public policy issue. It has not yet been resolved.

On June 11, 1973 the U. S. Supreme Court affirmed, by an equally divided court, the judgement of the U. S. Court of Appeals for the District of Columbia on November 1, 1973 affirming the decision on May 30, 1972 of the U. S. District Court for the District of Columbia to issue a preliminary injunction requiring the Administrator of the Environmental Protection Agency (EPA) to promulgate regulations "as to any State plan which he finds, on the basis of his review, either permits the significant deterioration of existing air quality in any portion of any State or fails to take the measures necessary to prevent such significant deterioration." On July 16, 1973 the Administrator of EPA proposed four alternative plans setting forth various approaches to defining and preventing "significant deterioration" in areas where air pollution levels currently are below the national ambient air quality standards. These proposals and additional background information are published at 38 F. R. 18986, July 16, 1973. Any final plan(s) promulgated by EPA with respect to the definition and prevention of "significant deterioration" would be incorporated into the proposed prototype oil shale lease program since the proposed Oil Shale Lease Environmental Stipulations already provide that:

> At all times during construction and operation, lessee shall conduct its activities in accordance with all applicable air quality standards and related plans of implementation adopted pursuant to the Clean Air Act, as amended...and applicable State standards. (Volume III, Chapter V, Section 8(A).

Thus, all applicable environmental standards will need to be met.

TABLE 2

STATE AMBIENT AIR QUALITY STANDARDS ($\mu g/m^3$)[1/]

	Colorado	Utah	Wyoming
Particulates	45[2/]	90	75
Sulfur Dioxide	10[2/]	60[4/]	71[5/]
Nitrogen Oxides	none	none	none
Oxidants	[3/]	none	none
Hydrocarbons	[3/]	none	none
Carbon Monoxide	[3/]	none	none

1/ All States must enforce the U.S. Ambient Air Quality Standards in addition to state air quality standards.

2/ By January 1, 1980.

3/ Colorado has developed standards for these pollutants applicable to the Denver Met. Air-Quality Region only.

4/ Proposed.

5/ H_2S Standard - $\frac{1}{2}$-hour maximum.

TABLE 3

FEDERAL AND COLORADO AMBIENT AIR QUALITY STANDARDS ($\mu g/m^3$)

Pollutant Averaging Time	Federal Standards		Colorado Standards			
	Primary	Secondary	Non-Designated Area [5]	Designated Area [6] 1973	1976	1980
Particulate						
Annual G.M.	75	60 [3]	45	70	55	45
24-Hr. Max. [1]	260	150	150	200	180	150
Sulfur Dioxide						
Annual A.M.	80	60 [4]	-	60	25	10
24-Hr. Max. [1]	365	260 [3] [4]	15	300	150	55
3-Hr. Max. [1]	-	1300	-	-	-	-
1-Hr. Max. [2]	-	-	-	800	300	-
				Proposed (DAQCR) [7]		
Oxidant						
1-Hr. Max. [1]	160	160	-	98		
.8-Hr. Max. [1]	-	-	-	59		
Annual	-	-	-	20		
Hydrocarbons						
3-Hr. Max. [1]	160 [3]	160 [3]	-			
6-9 am.				6,560		
1-Hr.	-	-	-	3,280		
8-Hrs.	-	-	-	1,312		
Carbon Monoxide						
8-Hrs. Max.	10,000	10,000	-	11,450		
1-Hr. Max.	40,000	40,000	-	28,625		
Annual	-	-	-	2,290		
Nitrogen Oxides						
Annual A.M.	100	100	-	-		

1/ Not to be exceeded more than once per year.
2/ Not to be exceeded more than once per month.
3/ As a guide to be used in assessing implementation plans for achieving other primary or secondary standards.
4/ EPA rescinded these standards September 14, 1973, Federal Register, Vol. 38, No. 178.
5/ Non-designated areas are those which are very clean which Colorado intends to maintain.
6/ Designated areas refer to areas on the eastern slope which already exceed the primary Federal Standards.
7/ Denver Air Quality Control Region.

SPECIFIC MONITORING REQUIREMENTS

Air Quality Monitoring

Pre-Development

In order to fully define the baseline status of the ambient air in the vicinity of future oil shale development, it will be necessary to deploy at least four (4) monitoring stations. The exact location of these stations will be governed by the specific area under evaluation. However, the main installation(s) should be located in the immediate vicinity of the projected mine location and the projected location of the conversion plant (if these are located within one mile of each other, one "main" site is needed.) Locations of the other installations should be in the predominately downwind area of the projected facilities and one installation in the predominately upwind area.

Parameters of interest include:

- Sulfur Dioxide
- Particulates
- Nitrogen Oxides
- Oxidants
- Hydrocarbons - Methane and Non-Methane Hydrocarbons
- Aldehydes
- Ammonia
- Carbon Monoxide
- Hydrogen Sulfide

Only the installation at the projected conversion plant site is required to monitor all the pollutants of interest. The satellite installations are not required to monitor all pollutants(depending on lease stipulations and letters of approval) and will monitor all but aldehydes, ammonia and hydrogen sulfide. Averaging times are, in most cases, dictated by the applicable standard, and are as follows:

- Particulates--24 hours
- All gaseous parameters--1 hour

For purposes of the gaseous measurement, when continuously recording instrumentation is used, a one-minute average taken on-the-hour and on-the-half-hour will comprise the hourly average, i.e., 3 one-minute readings per hour define the hourly average. Reporting format should be the standard coding structure and formats known as Storage and Retrieval of Aerometric Data (SAROAD) which has been adopted by the U. S. Environmental Protection Agency. The format for recording 24 hour particulate data appears as Figure 1 and the format for recording one hour gaseous data appears as Figure 2 in Appendix 1. A complete explanation of how to report air quality in SAROAD formats is given in SAROAD Users Manual, EPA, Office of Air Programs Publication No. APTD 0663.

It is recommended that all of the stations be of a movable configuration, i.e., van mounted. This recommendation is made to assure maximum utilization of the instruments as the demands of the system change, i.e., location of maximum pollutant concentration calculated to be at location not currently sampled.

Development Phase

All parameters enumerated under Pre-Development Phase shall be monitored during this phase.

Operational Phase

During this phase the location of one downwind station may be modified to the location of the theoretical maximum concentration. Reporting frequencies and format should be the same as previously noted. If concentrations monitored during this phase for two continuous years are within 10% of the baseline values, these parameters need no longer be monitored.

Methods Used

All analytical methods utilized will conform with current EPA recommended methods as specified in the Federal Register. Table 4 shows the analytical methods for the parameters of interest.

Calibration Techniques

All instruments should be calibrated at least weekly. It is recommended that daily calibration checks be instituted where applicable. For example, infra-red determination of carbon monoxide may require a daily calibration due to excessive electronic drift. Familiarization with instrumentation should be used as a guide to calibration frequency. In no case, however, should sampling periods longer than one week be undertaken without instrument calibration.

Meteorological Data Acquisition

In order to obtain the necessary data for input into diffusion models, it will be necessary to monitor several meteorological variables. These include:

- wind speed/direction
- relative humidity
- temperature profile
- precipitation
- barometric pressure

The meteorological installation should be located at the proposed conversion site. At least three levels of measurement are required--ground level, 30 feet, and 100 feet.

TABLE 4

SAMPLING CHARACTERISTICS

POLLUTANT	AVERAGING TIME	ANALYTICAL† METHOD
Particulate	24 hour	Hi-Vol
Sulfur Dioxide	1 hour	Pararosaniline
Oxidants	1 hour	Ethylene Chemiluminescence
Hydrocarbons	1 hour	Hydrogen Flame Ionization
Carbon Monoxide	1 hour	Non-dispersive Infrared
Oxides of Nitrogen	1 hour	Saltzman**
Aldehyde	1 hour	Colorimetric*
Ammonia	1 hour	Nessler*
Hydrogen Sulfide	1 hour	Colorimetric

* EPA Reference Method has not yet been specified.

**Or asrsenite, chemiluminescence or equivalent.

† Equivalent methods may be substituted.

TABLE 4

SAMPLING CHARACTERISTICS

POLLUTANT	APPROACH TIME	ANALYTICAL METHOD
Particulate	24 hour	Wt-Vol
Sulfur Dioxide	1 hour	Pararosaniline
Oxidants	1 hour	Ethylene Chemiluminescence
Hydrocarbons	1 hour	Hydrogen Flame Ionization
Carbon Monoxide	1 hour	Non-dispersive Infrared
Oxides of Nitrogen	1 hour	Saltzman**
Aldehyde	1 hour	Colorimetric*
Ammonia	1 hour	Nessler*
Hydrogen Sulfide	1 hour	Colorimetric

* EPA Reference Method has not yet been specified.

**Or equivalent, chemiluminescence or equivalent.

† Equivalent methods may be substituted.

Operations of the meteorological installation shall be for the pre-developmental, developmental and operational phases. Sufficient information on the wind structure and stability index (for modeling purposes) would be obtained during the first two phases. Additional data taken during the operational phase is required so that field verification of the models can be made. The operational phase monitoring of meteorological parameters will end after two years of operation.

Radiation Monitoring

The extent to which the natural radiation background of a region might be altered as a result of mining oil shale cannot be predicted. Our knowledge of the sources and mechanisms which determine local levels of natural radiation indicates that significant changes could be experienced if vast areas of the earth's surface are disturbed or large quantities of rock are stockpiled and exposed to the atmosphere.

The radiation monitoring program described in the present section is designed to establish the baseline level of natural radiation in a particular area before intensive mining operations are undertaken and to provide adequate surveillance while such activities are in progress.

Natural Background Radiation

External exposure of man from natural background results primarily from cosmic radiation and terrestrial gamma radiation. Dose equivalent rates from these sources vary with altitude, geomagnetic effects related to latitude and the amounts of natural radioactive material present in the earth's crust.

Internal exposures arise from the deposition within the body of radionuclides that have been inhaled or ingested.

Extensive measurement and studies have shown natural radiation in the United States ranges from 80 to 250 millirem per year; the estimated* total average whole-body dose is 102 millirem per year.

The States of Colorado and Utah, because of their geographical location, altitude and geology are subject to some of the highest levels of natural background radiation in the United States. Applicable estimates of the average annual dose from all background sources are compared to the national average in the following table:

*National Academy of Sciences, the Effects on Populations of Exposures to Low Levels of Ionizing Radiation, November 1972.

Source	Annual Dose millirem/person/year		
	Colorado*	Utah*	USA†
Cosmic Rays	120	115	44
Terrestrial Radiation			
External	105	40	40
Internal	25 ⊙	25 ⊙	18
TOTAL	250	180	102

* A.W. Klement, Jr., et al. Estimates of Ionizing Radiation Doses in the United States, 1960-2000, U. S. Environmental Protection Agency ORP/CSD 72-1, August 1972

† National Academy of Sciences, Op.Cit.

⊙ The national average assumed by Klement et al.

The primary determinant of the terrestrial radiation level in a given location is the soil concentration of natural radionuclides. Significant external gamma exposures from terrestrial sources are generally produced by potassium-40 (K-40) and the decay products of the uranium-238 (U-238) and thorium-232 (Th-232) chains. One of the products found in each of these decay chains is the gas radon (Rn); Rn-222 is the radioisotope in the first chain and Rn-220 in the second. The radiation level above the ground is known to depend on the surface characteristics which control the rate at which radon emanates from the earth and the atmospheric conditions which determine its dispersion. Soil characteristics, such as porosity, moisture content and vegetation, influence the diffusion of radon. Wind, temperature inversions and barometric pressure affect the air-concentration of radon and radon daughters and hence the possible exposure from these radioisotopes.

In addition to the gamma rays from terrestrial sources, alpha and beta particle emissions also occur. The alpha particles are, for the most part, entirely absorbed in the soil. The beta rays are attenuated rapidly by soil and air so that neither alpha nor beta radiation contributes significantly to the external background dose received by man. However, the alpha and beta emitters could become significant sources of internal radiation if the transport of the relevant radionuclides to ground and surface waters is promoted.

Source	Sum of Squares	df	Mean Square	F Value
Model	520	5	104	20.80 ⊙
A-Concentration	25	1	25	5.00
B-Temperature	180	1	180	36.00 ⊙
AB	45	1	45	9.00
Curvature	111	1	111	22.20 ⊙
Residual	150	30	5	
Lack of Fit	150	25	6	*
Pure Error	0	5	0	
Cor Total	670	35		

While all of the natural radionuclides contribute to internal doses, only a few are normally found to be significant. Ingested K-40, Rn-222 and polonium-210 (Po-210) are the major contributors to whole-body doses and Po-210, Rn-222 and the radium isotopes Ra-226 and Ra-228 are the major contributors of doses to the endosteal cells (bone).* Normally, the only natural radionuclide which leads to significant widespread exposures through inhalation is Rn-222. The estimated whole-body dose from dissolved radon in the human body is 3 millrem per year in the United States; estimates for lung doses from inhaled radon range from 100 to 900 millirem per year.

Shale Development Activities

The change agents associated with the mining and processing of shale rock which might influence the local radiation background include the following:

- o Generation of dust and the ensuing increase in particulate loading of the atmosphere.
- o Extensive changes in surface composition and features of the earth.
- o Exposure and weathering of rock surfaces not previously exposed.
- o Changes in area drainage patterns.
- o Changes in runoff and inseepage characteristics of the surface.
- o Runoff from accumulated stockpiles of shale rock and rubble.

Radiation Monitoring Program

The monitoring program summarized in Table 5 is intended to monitor all the elements of the natural environment which might exhibit the effects of an altered radiation background. Measurements are made of direct radiation, activity levels of airborne particulates, dissolved concentrations of radioisotopes in ground and surface waters, activity levels of soils which might be affected by the settling of dust and sediments in drainage streams and bodies of surface water.

An indication is given as to the general positioning of sampling stations. The selection of the precise locations would be specific to a particular mining site, with due consideration being given to the local meteorology, drainage patterns and other surface characteristics.

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*Klement et al. Op. Cit.

The frequencies for monitoring are given in the table and are applicable to all phases of mining development. These frequencies have been selected with a view to determining the periodic and seasonal variations in radioactivity levels which might result from natural causes. If during any phase measurements indicate that significant increases in radiation occur, the "additional monitoring" parameters given in Table 5 should be included as part of the program. If, after two years of the operationsl phase, the data is within 10% of the base-line data, those parameters need no longer be monitored.

A standardized format for reporting the findings of a radiation monitoring program is presently being obtained from the Eastern Environmental Radiation Facility in Montgomery, Alabama. The Environmental Radiation Ambient Monitoring System (ERAMS) is an established radiological monitoring program which offers a uniform and nationally comparable data base. The ERAMS provides a standardized data collection basis, but one which can be altered to comply with the requirements of the prototype oil shale leasing program.

TABLE 5

BACKGROUND RADIATION MONITORING PROGRAM

SAMPLE TYPE	RADIOACTIVITY MONITORED	MONITORING TECHNIQUE	SAMPLING FREQUENCY	SAMPLING STATIONS
Direct Radiation	β and γ	Thermoluminescent dosimeter	Quarterly and annually, integrated dose	Area surface monitoring
Airborne Particulates	Gross β	High efficiency filter and Gas-flow proportional counter	Weekly on sample collected continuously	Area surface monitoring
	γ-isotopic	γ-spectrometry	Monthly composite of weekly samples	Area surface monitoring
Surface Water	Gross β/ γ-isotopic	Gas-flow proportional counter and γ-spectroscopy	Quarterly	Area streams and lakes with particular emphasis on drinking water supplies
Ground Water	Gross β/ γ-isotopic	Gas-flow proportional counter and γ-spectrometry	Quarterly	Untreated well water from wells near the site of mining activities
Sediment	γ-isotopic	γ-spectrometry	Quarterly	Drainage streams and lakes in the area
Soils	γ-isotopic	γ-spectrometry	Annually	Core samples from area
Additional Monitoring				
Aquatic biota	γ-isotopic	γ-spectroscopy	Quarterly	Important fish and food organisms in area surface waters
Vegetation	γ-isotopic	γ-spectroscopy	Quarterly	Area vegetation

APPENDIX 1

ENVIRONMENTAL PROTECTION AGENCY
National Aerometric Data Bank
P.O. Box 12055
Research Triangle Park, N.C. 27711

24-HOUR OR GREATER SAMPLING INTERVAL

[2] (1) Agency

City Name

Site Address

Project

Time Interval

State Area Site (2 3 4 5 6 7 8 9 10)

Agency (11) Project (12 13) Time (14) Year (15 16) Month (17 18)

Name
PARAMETER
Code (23 24 25 26 27)

Method (28 29) Units (30 31) DP (32)

Name
PARAMETER
Code (37 38 39 40 41)

Method (42 43) Units (44 45) DP (46)

Name
PARAMETER
Code (51 52 53 54 55)

Method (56 57) Units (58 59) DP (60)

Name
PARAMETER
Code (65 66 67 68 69)

Method (70 71) Units (72 73) DP (74)

Day (19 20)	St Hr (21 22)	(33 34 35 36)	(47 48 49 50)	(61 62 63 64)	(75 76 77 78)
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
DP →		4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0

FIGURE 1

SAROAD DAILY DATA FORM

LESS THAN 24-HOUR SAMPLING INTERVAL

1 _____ Agency

_____ City Name

_____ Site Address

ENVIRONMENTAL PROTECTION AGENCY
National Aerometric Data Bank
P. O. Box 12055
Research Triangle Park
North Carolina 27711

_____ Parameter observed

_____ Time interval of obs.

_____ Method

_____ Units of obs.

State Area Site (2 3 4 5 6 7 8 9 10)

Agency (11) | Project (12 13) | Time (14) | Year (15 16) | Month (17 18)

Parameter code (23 24 25 26 27) | Method (28 29) | Units (30 31) | DP (32)

Project

Day	St	Hr	Rdg 1	Rdg 2	Rdg 3	Rdg 4	Rdg 5	Rdg 6	Rdg 7	Rdg 8	Rdg 9	Rdg 10	Rdg 11	Rdg 12
19 20	21 22		33 34 35 36	37 38 39 40	41 42 43 44	45 46 47 48	49 50 51 52	53 54 55 56	57 58 59 60	61 62 63 64	65 66 67 68	69 70 71 72	73 74 75 76	77 78 79 80

FIGURE 2

SAROAD HOURLY DATA FORM

WATER QUALITY MONITORING

GENERAL

The objectives of this section are to establish monitoring criteria for surface and subsurface waters and their quality in the area of oil shale development. On the whole, the area under consideration has seen minimal impact from man's activities. Thus, a properly executed water quality monitoring program conducted prior to development activities to include at least two years of data, reflecting, two complete seasonal cycles, should prove adequate to define the approximate stable water quality base-lines.

The approach is based on a knowledge and definition of the respective drainage basins involved. By this method the limits of the appropriate drainage basins associated with the site are identified and physically delineated on USGS topographic maps. After defining the stream flow network within the basins, sampling stations are then selected at key locations to measure and thus define the water quality parameters coming into as well as leaving the site of activity.

In general, four categories of surface sampling stations will be needed to establish the sampling network to cover the development area. These are:

1. On-site sampling strations at key drainage locations.
2. On-site sampling stations at locations downstream of specific areas of activity.
3. Off-site sampling stations, and
4. Springs and seepages.

On-site sampling stations will be selected as activities or oil shale development proceeds. These sites should be downstream of the area of activity and located in such a way as to reflect water quality perturbations.

On-site sampling stations located at key drainage locations are selected to provide information which reflects charges and effects of on-site water quality stations to reflect water coming into as well as leaving the site and all on-site activities. Off-site sampling stations are selected to reflect water quality base-lines and changes resulting from inputs of on-site contributions.

To define water quality and estimate changes it will be measured during three specific phases:

(1) Baseline (pre-development)

(2) Development

(3) Operational

Well Locations

In general, well locations should be located "down stream" of any proposed activity site. There are essentially two sub-surface waters that must be considered, those waters which lie above the shale deposits and those which lie below. Those which lie above the deposits will be affected mostly by surface activities and the hydraulic gradients will be somewhat similar to the ground contours. Hence, these wells should be located down the slope of any proposed activity. Wells that will be used for potable water supplies on the other hand, should be located above the areas of activity.

Since the wells are fed by infiltration and sub-surface flows, they will begin to show signs of impact due to some surface activity only after sufficient time has elapsed--probably on the order of several months or perhaps years. Because of this, frequency of sampling will be affected.

Wells beneath the shale deposits will be affected by the mining activity to a lesser degree and may not, in fact, show any signs of impact until the tailings are placed back into the mined areas and leachings of residual contaminants occur. Such wells might, in fact, not show signs of degradation until after some time, perhaps years, after the project has been completed.

Seeps and springs will, in general, reflect the waters of the overlying strata, i.e., the wells above the shale deposits.

Parameters To Be Monitored

The water quality parameters to be monitored for on-site and off-site sampling stations as well as for springs, seeps and wells are shown on Table 1.

Frequency of Examination

Frequency of water quality parametric examinations are also shown on Table 1. Generally, the more readily determined parameters will be monitored continuously, such as specific conductivity, dissolved oxygen, pH and stream flow. Other fairly common water quality parameters, ammonia, total alkalinity, etc., will be monitored monthly, and less common parameters (metals, pesticides, etc.) will be monitored quarterly.

TABLE 1

WATER QUALITY PARAMETERS--SURFACE SAMPLES AND WELLS
PRE-OPERATIONAL PHASE

	Monthly	Quarterly	Continuous
Ammonia	X		
Alkalinity, total	X		
Alkyl Benzene Sulfonate (ABS)		X	
Alsenic		X	
Barium		X	
Bicarbonate			
Boron		X	
Cadmium		X	
Calcium	X		
Carbon Chbroform Extract		X	
Carbonate	X		
Chloride	X		
Chromium (hexavalent)		X	
COD	X		
Coliforms Total		X	
Coliforms Fecal		X	
Color	X		
Conductivity, Specific			X
Copper		X	
Cyanide		X	
Dissolved Oxygen			X
Fluoride		X	
Hardness, total	X		
Iron	X		
Kjeldahl Nitrogen	X		
Lead		X	
Lithium		X	
Magnesium	X		
Manganese		X	
Mercury		X	
Nickel		X	
Nitrate	X		
Nitrite	X		
Odor		X	
Oil & Grease		X	
Ortho-Phosphate	X		
Total Phosphorous	X		
Pesticides		X	
pH		X	
Phenols		X	
Potassium	X		
Radium 226			
Selenium		X	
Silica	X		
Silver		X	
Sodium	X		
Solids Total Dissolved		X	
Solids, total		X	
Solids, total, perce-t volatiles		X	

TABLE 1 (CONTINUED)

	Monthly	Quarterly	Continuous
Solids suspended, total		X	
Solids suspended, volatile		X	
Sediments, Bottom, percent volatiles		X	
Strontium 90		X	
Sulfate	X		
Sulfide		X	
Turbidity	X		
Vandium		X	
Zinc		X	
Total Organic Carbon (TOC)*		X	
Stream Flow			X
Stream Temperature			X
Well Water Temperature (Discharge)			X

*If TOC (Total Organic Carbon) is in excess of 5 mg/l, dissolved organic carbon, suspended organic carbon, polycyclic aromatics, sulfur (acid extraction), nitrogen (base extraction).

Developmental Operational Phase

The development and operational phase will follow the same sampling program and determine the same water quality parameters indicated on Table 1.

Generally, if concentrations monitored during the operational phase for two continuous years are within 10% of the base-line values, the parameters need no longer be monitored.

Development Phase

The parameters are frequency noted on Table 1 will be determined during this phase,

In addition to the sampling sites that have been designated under the base-line confirmation, additional sampling stations should be selected and located at the nearest stream, downstream of the activity being carried out. These sampling stations will be examined for the same parameters and at the same frequency as indicated on Table 2.

Methods Used

All analytical methods used should conform with current EPA recommended methods as specified in the Federal Register, Vol. 38, No. 199, Oct. 16, 1973, "Guidelines Establishing Test Procedures For The Analysis of Pollutants." Table 1 lists the approved test procedures, 40 CFR 136 (Supp. 1974).

Use of sample preservation techniques and holding time specified in analytical methods or in EPA manual entitled, "Methods for Chemical Analysis of Water and Wastes". Laboratory Quality control should be according to EPA "Handbook for Analytical Quality Control in Water and Wastewater Laboratories".

TABLE 2

WATER QUALITY PARAMETERS--SURFACE SAMPLES AND WELLS
OPERATIONAL PHASE

	Monthly	Continuous
Ammonia	X	
Alkalinity, total	X	
Arsenic	X	
Barium	X	
Bicarbonate	X	
Boron	X	
Cadmium	X	
Calcium	X	
Carbonate	X	
Chloride	X	
Chromium (hexavalent)	X	
COD	X	
Coliforms Total	X	
Coliforms Fedal	X	
Color	X	
Conductivity, Specific		X
Copper	X	
Cyanide	X	
Dissolved Oxygen		X
Fluoride	X	
Hardness, Total	X	
Iron	X	
Kjeldahl Nitrogen	X	
Lead	X	
Lithium		
Magnesium	X	
Manganese	X	
Mercury	X	
Nickel	X	
Nitrate	X	
Nitrite	X	
Odor	X	
Oil & Grease	X	
Ortho-Phosphate	X	
Total Phosphorous	X	
Pesticides	X	
pH		X
Potassium	X	
Radio Activity	X	
Gross Alpha	X	
Gross Beta	X	
Selenium	X	
Silica	X	
Sodium	X	
Solids, total	X	
Solids, total, percent volatiles	X	
Solids, suspended, total	X	

TABLE 2 (CONTINUED)

	Monthly	Continuous
Solids, suspended, volatile	X	
Sediments, Bottom, percent volatiles	X	
Sulfate	X	
Sulfide	X	
Turbidity	X	
Vanadium	X	
Zinc	X	
Total Organic Carbon (TOC)*	X	
Stream Flow		X
Stream Temperature	X	
Well Water Temperature	X	

BIOLOGICAL MONITORING

GENERAL

The biological monitoring program to be established in the area of oil shale development will have as its purpose:

(1) Monitoring the biological indicators of existing environmental conditions,

(2) Monitoring the indicator species during area development,

(3) Monitoring the indicator species during operation.

The biological indicator properly applied can provide useful information. The major advantages of biological monitors are: (1) they integrate all environmental effects and reflect the total environment; (2) they show rates of change in the environment; (3) they eliminate the difficult task of relating physical and chemical measurements to biological effects; (4) they indicate trends in the environment; and (5) they show the pathway and points of accumulation of pollutants and toxicants in ecological systems. Although either single or several species may be used as indicators, studies exist that indicate that entire communities may be used as indicators. Here shifts in species composition or diversity are the parameters examined. However, the problem is to sort out cyclic or long term trends from environmental effects, as well as relating changes to particular pollutants.

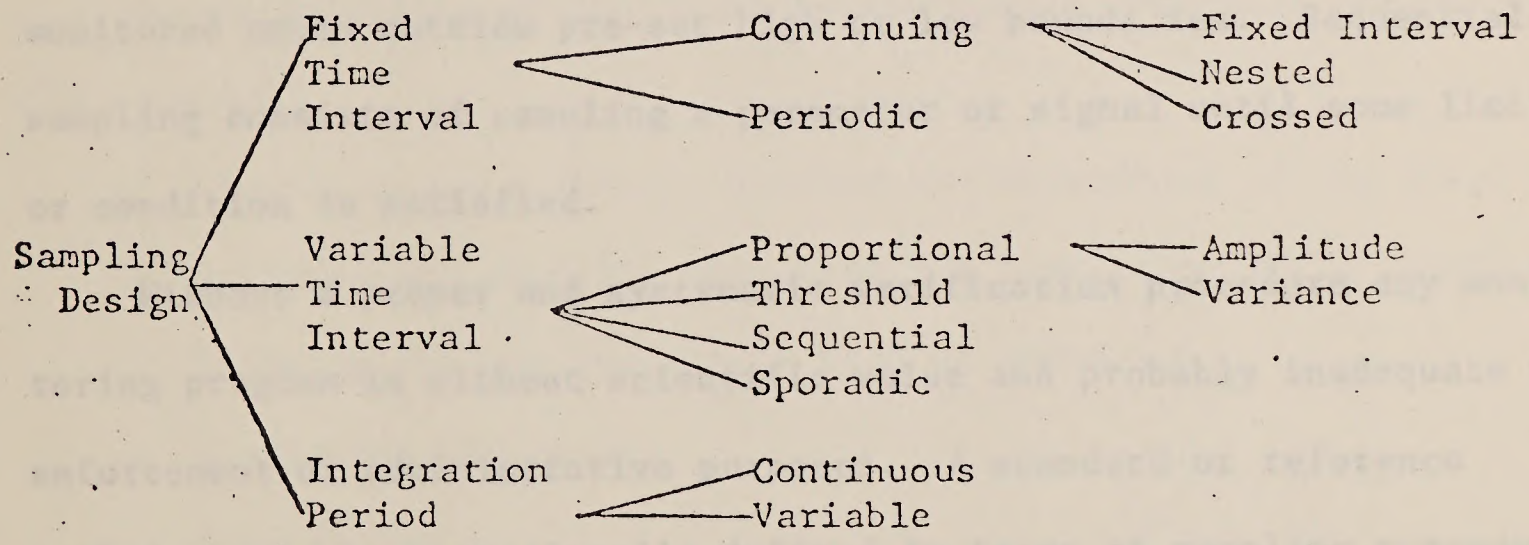
Indicators have been developed in the past by employing simple deterministic models of variable relationships. A more powerful tactic would apply multivariate statistical methodology, such as principal component analysis and canonical correlation, to effectively reduce the dimensionality of the presentation manifold.

It has been suggested that the folloiwng criteria be applied in selecting biological monitoring organisms:

- o widespread geographical distribution
- o must be abundant
- o must be sensitive to environmental change
- o must show a well defined response
- o not the object of particular control

Considering the inherent variability of natural populations, emphasis should be given to sampling theory and sample design. Sample design has two distinct objectives: (1) the estimation of total numbers of a specified population or some statistic related to this estimate, and (2) the description and interpretation of patterns within the population of interest.

A diagramatic summary of sampling design approaches is given below:



The concept is dominated by temporal aspects: the time interval between measurements, averaging or integration time and eventually reporting time. The interval between measurements can be fixed or variable. Fixed time intervals are commonly used by continuous and

periodic sampling devices. A host of other options result when variable time intervals are considered. These sampling schemes offer many advantages in minimizing cost, storage and data requirements.

Sampling designs usually fall into one of two classes: random or systematic. Random designs applied to natural populations usually have a large error. A well planned systematic sampling design, on the other hand, would give a more precise estimate even though it is not possible to know the degree of precision. The problem can usually be overcome by conducting a pilot survey to gain information about the population mean.

The idea of proportional sampling is to gear the sampling rate to such characteristics of the signal as variation, amplitude or a combination thereof. Threshold or alarm sampling is based on the concept of collecting and transmitting data only if the parameter being monitored moves outside pre-set high or low boundaries. Sequential sampling consists of sampling a parameter or signal until some limit or condition is satisfied.

Without a proper and systematic verification procedure any monitoring program is without scientific value and probably inadequate for enforcement or administrative purposes. A standard or reference method should be operationally defined in terms of sampling procedures, equipment, sample handling, laboratory testing, and published and promulgated by a regulatory group. A standard method should have at least, the following characteristics:

- o Utility
- o Reliability
- o Maintainability
- o Low cost
- o Sensitivity
- o Specificity

SPECIFIC BIOLOGICAL MONITORING REQUIREMENTS

Pre-Development

At least two years prior to project initiation field surveys, laboratory investigations and pertinent data collection efforts should be begun. The data collection effort would consist of obtaining background information on species composition, population dynamics, migratory pathways, etc. which have previously been compiled by area experts. These contacts would include area universities, game wardens, Department of the Interior Regional Office and/or field office, State and local conservation agencies. This documentation is then supported by comprehensive field surveys and laboratory investigations.

The organization of the field survey should generally follow the steps below:

- o Identifying and clearly stating the objectives of the program
- o Defining the sampling unit (and the population to be sampled)
- o Choosing the way the sample will be drawn
- o Conducting the survey
- o Data analysis

The above investigations should result in the selection of the indicator species, populations or communities as defined previously. At this point the various levels of biological integration will provide factors which may require consideration and may be rather unique to

that particular level. Table 1 provides a partial taxonomy of such factors as classified by integration level. This is not meant to imply that all such possible factors must be considered; however, such factors may serve as convenient monitoring points based on the information obtained during the background survey. It is important that the best possible taxon for measurement be selected. This, of course, is one of the central points in the concept of indicator species. Table 2 provides examples of specific biological factors related to the higher biotic groups.

TABLE 1

EXAMPLES OF BIOLOGICAL FACTORS CLASSED BY INTEGRATION LEVELS

(1)
Cellular Level

Blood Chemistry
Mutagenicity
Structural Modification
Chemical Composition

(2)
Tissue Level

Structural Modification
Chemical Analysis

(3)
Organ/Organismic Level

Photosynthesis
Hormone Interactions
Respiration
Fluid Pressures

(4)
Behavioral

Reproduction
Feeding
Migration
Periodity
Host/Parasite
Predator/Prey

(5)
Community Structure/
Interactions

Species Diversity
Seasonal Fluctuations
Energy-mass flow patterns
Trophic Relationships
Predator/Prey
Succession
Diel Rhythms
Host/Parasite

(6)
Population Dynamics

Density
Natality
Mortality
Age Distribution
Physical Distributional
Pattern

(7)
Ecosystem

Flow of Material
Energy Flow
Productivity
Variability/Cyclic Phenomena
Diversity/Complexity Structure

(8)
Man-Made Populations

Similar to the lower levels of
integration

TABLE 1

EXAMPLES OF ECOLOGICAL FACTORS CLASSED BY INTEGRATION LEVELS

(1) Cellular Level	(2) Tissue Level	(3) Ocean/Organismic Level
Blood Chemistry Nutrient Uptake Structural Modification Chemical Composition	Structural Modification Chemical Analysis	Photosynthesis Hormone Interactions Respiration Fluid Pressures
(4) Behavioral	(5) Community Structure/ Interactions	(6) Population Dynamics
Reproduction Feeding Migration Territory Heat/Parasite Predator/Prey	Species Diversity Seasonal Fluctuations Energy-mass flow patterns Trophic Relationships Predator/Prey Succession Diel Rhythms Heat/Parasite	Density Mortality Natality Age Distribution Physical Distributional Factors
(7) Energetics	(8) Man-Made Perturbations	
Flow of Material Energy Flow Productivity Variability/Cyclic Phenomena Diversity/Complexity Structure	Shelter to the lower levels of Integration	

TABLE 2

POTENTIAL INFORMATION CONTENT OF SOME BIOTIC ELEMENTS

Woody Plants	Herbaceous Plants	Mammals
Chemical Composition	Periodicity	Structural Modification
Structural Modifications:	Chemical Composition	Chemical Composition
Photosynthesis Rates	Structural Modification	Blood Chemistry
Respiration Rates	Photosynthesis Rates	Reproductive Behavior
Fluid Pressures	Respiration Rates	Respiration Rates
Species Diversity	Hormone Activity	Species Diversity
Seasonal Fluctuations	Trophic Relationships	Trophic Relationships
Mortality	Host-Parasite Relationships	Host-Parasite Relationships
Age Distribution	Species Distribution	Population Characteristics
Physical Distribution	Growth Form	Density
Growth Form	Population Density	Natality
	Special Plantings	Mortality
	Fumugation Experiments	Age Distribution
	Productivity	Secondary Production

APPENDIX II

MANAGEMENT PLAN VOLUME II

GUIDANCE FOR THE LESSEES

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1.0 INTRODUCTION

This volume has been developed (1) to assist the Lessees in meeting requirements for reports and plans (Section 2.0) specified in the lease, Federal Regulations, directions from the Area Oil Shale Supervisor, as well as other pertinent sources, (2) to advise the Lessees of the inspections (Section 3.0) that are required by Federal Regulations, and (3) to inform the Lessees of the meetings (Section 4.0) in which they are involved and/or should have a significant interest.

This volume is to serve as a guideline only. Alterations in content and format in reports and plans are expected, except in those instances which are specifically required by pertinent authorities, i.e., Codes of Federal Regulations, Exploratory Plans, Letters of Approval, etc. While those aspects not specifically identified by these authorities are subject to alteration without formal approval, it's suggested that major alterations be coordinated with the Area Oil Shale Supervisor's Office.

In general, specific formats for required reports have not been proposed, thus allowing the Lessees maximum flexibility and freedom in developing methods of data presentation which are most compatible with their development and operational programs. However, some general guidelines are recommended. Choice of format and forms will depend largely upon the nature of the data and procurement methods. In general, whenever possible, data should be presented in tabular form, making sure to include appropriate terms of measurement. Graphical illustrations such as charts, graphs and maps should be included whenever they will make the presentation more comprehensible and complete. Graphical illustrations will be particularly useful in depicting locations of monitor sites and delineating trends in data.

2.0 PLANS AND REPORTS

2.1 General

This section describes the plans and reports to be prepared by the Lessees. The numerous plans and reports identified in the lease, 30 CFR 231, and 43 CFR 23 have been reduced in number by combining documents where feasible. Thus, for example, many separate reporting requirements can be satisfied by the Detailed Development Plan, the Quarterly Progress Report, and the Annual Progress Report.

Table 2.1 summarizes information about the plans and reports required of the Lessees, the authority which dictated the report, and when the plan or report is due.

The following sections discuss the plans and reports and include suggested outlines and recommended formats.

2.2 Exploration Plan

Submission of this plan by each Lessee was required before any exploratory work began. According to the Lease, Section 10(d), "exploratory work. . . shall include. . . seismic work, drilling, blasting, research operations, cross-country travel, the construction of roads and trails and other necessary facilities, and the accumulation of base line data. . ." The Lessees submitted exploration plans to the AOSS for review and approval by July 1974. To allow the Lessees to proceed with their exploratory work as expeditiously as possible, the AOSS is approving portions of the exploration plans. Changes to the plans to insure conformance with the basic objective of the prototype oil shale program are accomplished through an amendment process instituted by the AOSS. When a Lessee agrees in writing to these amendments, relevant portions of the exploration plans are deemed approved.

In accordance with Department procedures, the AOSS will submit Exploration Plans (or significant amendments, revisions, or supplement to such plans) to the OSEAP for comment prior to AOSS approval. The contents of the Exploration Plans address the following work areas.

- Surface and ground water
- Soils survey and productivity analysis
- Air quality and meteorology
- Flora and fauna
- Special environmental studies (noise, archaeology, scenic values)
- Fischer assays and other resource information
- Fish and wildlife management
- Erosion control and surface rehabilitation
- Support roads and facilities
- Revegetation

2.3 Detailed Development Plan

Submission of this document to the AOSS for review and approval is required before any development work begins. According to the Lease, Section 10, the plan is to be submitted prior to the third

TABLE 2.1

SUMMARY INFORMATION ABOUT PLANS AND REPORTS

TITLE	AUTHORITY	WHEN REQUIRED	TEXT REFERENCE
Exploration Plan	Lease, Sect. 10(d)	Before any exploration begins	2.2
Detailed Development Plan (DDP)	Lease, Sect. 10(d)	Before any development begins	2.3
Quarterly Progress Report	Area Oil Shale Supervisor	Within 45 days of the end of Feb, May, Aug, Nov.	2.4
Annual Progress Report	Lease, Sect. 10(c)	End of Calendar Year	2.5
Two Year Baseline Data Report	Lease Environmental Stipulations Sect. 1(c)	At end of the second consecutive year of data collection	2.6
Investments and Expense Report	Lease Sect. 16(a)	Recommend March, June, Sept., Dec. of each year	2.7
Production Report	Lease Sect. 16(a)	March, June, Sept, Dec of each year	2.8
Report of Cessation or Abandonment of Operations	43 CFR 23.10	30 days prior to cessation or abandonment	2.9

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TABLE 3.1

SUMMARY INFORMATION ABOUT PLANS AND REPORTS

TITLE	AUTHORITY	WHEN REQUIRED	TEXT REFERENCE
Exploration Plan	Lease, Sect. 10(b)	Before any exploration begins	2.2
Detailed Development Plan (DOC)	Lease, Sect. 10(d)	Before any development begins	2.3
Quarterly Progress Report	Area (s) Chair Supervisor	Within 15 days of the end of Feb, May, Aug, Nov.	2.4
Annual Progress Report	Lease, Sect. 10(c)	End of Calendar Year	2.5
Two Year Baseline Data Report	Lease Environmental Stipulations Sect. 1(f)	At end of the second consecutive year of data collection	2.6
Investments and Expense Report	Lease Sect. 16(a)	Recommend March, June, Sept., Dec. of each year	2.7
Production Report	Lease Sect. 16(a)	March, June, Sept, Dec of each year	2.8
Report of Cessation or Abandonment of Operations	43 CFR 23.10	30 days prior to cessation or abandonment	2.9

Anniversary Date (March 1977 for the Colorado leases, June 1977 for Utah) and is to include a schedule of proposed operations, a description of the procedure to be invoked to protect the environment, and a statement of due diligence in attaining production at an early time. Since the Lease, Section 5, allows development costs (other than plan preparation) to be credited against the bonus payments due on the fourth and fifth Anniversary Dates, it is to the Lessee's advantage to obtain early acceptance of their plans. According to the Lease Environmental Stipulations, Section 1(c) (1), a Lessee must accumulate one full year of baseline data before submitting his plan. At issue is how literally Section 1(c) (1) should be interpreted; it is recommended that the AOSS advise the Lessees that Detailed Development Plans may be submitted after one year of continuous monitoring according to approved baseline data collection plans for all parameters called for in accepted plans.

Like the Exploration Plan, this plan (DDP) will also be submitted to the OSEAP by the AOSS before he approves it. Unlike the Exploration Plan, however, the "environmental provisions" of the Detailed Development Plan must undergo public hearings.

Many of the plans and reports required of the Lessees by the Lease and by 30 CFR 231 and 43 CFR 23 have been included as major sections in the Detailed Development Plan. These plans and reports are shown in the outline for the plan below and in the annotated outline in Appendix II-1. Covering the three major areas of activities during the 20 year Leasehold period (development, operations, and cessation), the plan addresses the following topics:

- Transportation corridor plans (roads, pipeline, utilities)
- Fish and wildlife management plan
- Cultural investigation report
- Spill contingency plans (oil and hazardous materials)
- Erosion control and surface rehabilitation plan
- Pollution control
- Rehabilitation
- Revegetation plan
- Mining plan
- Environmental monitoring program
- Baseline data report
- Processing and upgrading
- Overburden disposal
- Spent shale disposal
- By-products management
- Tract construction
- Manpower requirements (recommended addition)
- Schedules of activities (recommended addition)
- Environmental controls (air/water/noise pollution, health and safety, fire prevention)

2.4 Quarterly Progress Report

The Lease provides that the AOSS may request that reports on baseline data and environmental monitoring data as well as on activities of the Lessees on the traces be submitted. The AOSS thus directed each Lessee to submit a progress report covering these items on a quarterly basis. To conform to a schedule which is consistent with seasonal activity for environmental baseline data the periods are 1 December - 28(29) February, 1 March - 31 May, 1 June - 30 August, 1 September - 30 November.

Each Quarterly Progress Report consists of two parts. One part is a summary of the progress for the quarter. It is designed for wide distribution among those in government and the private sector. The second part of the report contains all data from the baseline monitoring programs and work progress. Since these data are voluminous and in certain instances are company confidential, distribution is restricted. It is recommended that two copies of the second part be submitted to the AOSS. One copy should be kept intact by the AOSS and access limited to those with a need-to-know in accordance with lease terms and departmental regulations pertinent to the handling of proprietary information. The second copy should have all this information deleted so it may be made more readily available in routine AOSS office work as well as shown to interested parties who do not have a need-to-know.

The formats for both parts of the Quarterly Report have been designed to accelerate review by the AOSS, OSEAP, and other interested parties by using ring/post binders, stand-alone sections, etc. A suggested outline for the Quarterly Report can be found in Appendix II-2. It is further recommended that the summary be written using the same outline and numbering scheme as the full report (this allows easy cross referencing between the two reports).

An outline of the environmental baseline data from the various programs of the Lessees can be found in the matrix in Appendix II-3. The Appendix lists the parameters found in the exploratory plans and the AOSS's letters of approval.

A format for the Quarterly Progress Report has not been specified in order to allow Lessees maximum flexibility in developing the most compatible method of presenting the data they have obtained. Choice of formats and forms to present data will depend largely upon the nature of the data and, to some extent, on the methods used to process the data. In general, however, detailed raw data from the baseline monitor program should be presented in tabular form. Maps should also be included to illustrate the location and relationship of monitor sites. Charts and graphs may also be included. While the initial data analysis and management will be accomplished manually, it is suggested that sufficient information be collected and presented to allow conversion to the data management systems being utilized by the Environmental Protection Agency. Air quality data should be sufficient to convert to the EPA's Storage and Retrieval of Aerometric

Data System (SAROAD) and water quality data should be compatible with the EPA's Storage and Retrieval of Water Quality Data System (STORET). For additional information and detail of these systems, Lessees are referred to the SAROAD USER'S MANUAL (EPA Office of Air Programs, Pues No. APTD 0663) and the Storage and Retrieval of Water Quality Data - Training Manual (EPA Office of Water Programs W.P.SUR. in 50, 4,71).

The summary report will not include all of the detailed data, but should include an analysis of the trends and variations in data. The summary report would therefore be largely a discussion of data including maps, graphs and tables of representative data values. It is recommended that for parameters which are monitored more frequently than quarterly, average values as well as maximum and minimum values be included.

To facilitate comprehension of the data, each section of a report should include a short introduction which reveals the location of monitor sites, the procedures utilized for the analysis, equipment descriptions and sensitivity.

2.5 Annual Progress Report

43 CFR 23 requires each Lessee to submit an operations report annually to the AOSS. It is due at the end of each year. The Lease requires a progress report to be submitted annually on a lease year basis. Since the material contained in each report is similar and is reported for the same purpose, the two reports have been combined. To be consistent with other documentation requirements, it is recommended that the report be submitted on a calendar year basis.

Unlike the Quarterly Progress Report, this report can be a single volume. In content, it conforms to the topics presented in the Quarterly Report but it summarizes the material for the entire year. None of the material in the Annual Report is classified or confidential, and it is given wide distribution.

In general, the Annual Progress Report describes the operations performed on the leasehold during the period of time for which the report is filed. It is recommended that the report address the following topics:

- Work completed/on-going/begun this year
- Environmental baseline data collected
- Environmental monitoring program data collected
- Drilling operations
- Fish and wildlife management
- Milestone chart update
- Future activities
- Manpower (subcontract, staff)
- Expenditures

The Annual Progress Report should follow the format of the Quarterly Progress Report for environmental baseline or monitoring data to facilitate cross-referencing and correlation of data. This report should not be a mere compilation of the four quarterly reports. It should contain an analysis of seasonal trends in parameter values, with particular attention to parameter values which deviate significantly from average seasonal values. The format for the report should therefore be largely narrative and emphasize the use of graphs, charts and statistical procedures. While the analysis need not be exhaustive, it is important that significant durations of data values be examined to protect the Oil Shale Program from unwarranted accusations of adverse environmental conditions which may actually be the results of natural changes in the environment.

The format for the development and progress portions of the Annual Progress Report should be organized so that the information is easily accessible and the data can be cross checked with previous annual reports. Certain formats may be required for production information. The AOSS may direct that particular sections be clearly identified to facilitate access and review.

2.6 Two-year Baseline Data Report

Section 1(c) (1) of the Lease Environmental Stipulations gives the AOSS the option to prescribe when records of baseline data and subsequent monitoring are to be submitted. It is recommended that a baseline data report be submitted at the end of one full year's accumulation of data. A report on two full year's accumulation of data can be required by the Lease Environmental Stipulations, Section 1(c) (2).

It is recommended that the two year report be reviewed by the OSEAP prior to AOSS approval since it specifies each lease tract's environment prior to development activity. Data from the environmental monitoring program effort for each tract will be compared with the baseline data to determine the environmental impacts of oil shale leasing activities. It is thus imperative that each two-year Baseline Data Report be comprehensive and provide a meaningful set of baseline information.

It is recommended that the following topics be addressed in the report:

- Air quality and meteorology (including visibility)
- Surface water quality and hydrology
- Ground water quality and hydrology
- Biology (flora, fauna, ecosystem)
- Soil
- Noise
- Archaeology
- Aesthetic and cultural features

The format of this report should emphasize analysis of the values and trends of baseline parameters. The report should be essentially a discussion of the baseline data, including references and representative data to illustrate conclusions as to the quality of the environment. Particular attention should be placed upon determining seasonal environmental quality and trends in data values throughout the two-year exploration period. As a result, the use of comparison techniques such as graphs, charts and models should be emphasized. It is recommended that the format for this report follow as closely as possible, the format of preceeding reports to facilitate cross-referencing and correlation.

Based on the results of this report, modifications in the Detailed Development Plan may be required. Therefore, this report is very essential to the development phase of the program.

2.7 Investment and Expense Report

The justification for an Accounting/Financial Review can be found in the stated objectives of the prototype program, in the terms and conditions of the Lease, and in general principles of good management.

The Secretary of Interior has stated that an objective of the prototype program is to determine the commercial viability of oil shale mining. To attain this objective it is recommended that the AOSS require that an independent audit be performed of the financial statements of the Lessees. These statements should include as a minimum: balance sheet, income statement, and sources and uses of funds statement. These statements should conform to generally accepted accounting principles applied on a consistent and fair basis.

In addition to financial reporting, the Lessees are required by the Lease* to submit an investment and operating expense report and quarterly production reports to the Lessor. The Lessor will use these reports to determine the royalties due and to apply offsetting credits.

It should be noted that the income statement and sources and uses of funds statement provide investment and operating expense information on an annual basis. This information will probably be needed more frequently, hence the justification for a separate investment and operating expense report.

Section 14.0 of the DDP Outline submitted by MITRE recommends that a schedule of capital costs (i.e., sources and uses of funds and investment and expense reports) be submitted on a regular basis; the schedule would address the following:

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*Section 16(a), (b), Appendix I-4.

- Mine complex
- Processing sequence and major individual steps
- Overburden and waste disposal
- Access and communications
- Transportation

To be consistent with the due dates for the Production Report discussed below, for which quarterly reporting is required, the investment and expense report is also to be reported on a seasonal quarterly basis. In addition to these responsibilities, the Lease requires the Lessor to collect bonus and rental payments* and determine the amount of the general bond and the compliance bond, and apply them whenever necessary to ensure performance by the Lessees.

Upon commencement of mining operations the responsibilities pertaining to the collection and/or determination of royalties, rents, compliance bonds and bonus payments transfer to the AOSS from the BLM. In addition to these responsibilities, the AOSS must also attend to the financial administration of his office. As a minimum this will require annual budget estimates to be submitted to the U.S.G.S. to administer the financial terms and conditions of the Lease, and to administer the financial matters of the Area Oil Shale Office.

2.8 Production Report

According to the Lease, Section 16(a), the Lessee shall submit the report on a quarterly basis to the Lessor. As set out in the Lease, the report shall address:

- Amounts of minerals or products produced
- Methods of production
- The character and quality of the products
- Amounts of products disposed of
- The prices realized
- The amounts in storage and/or held for sale

This report, like the Expense Report, is not subject to inspection without the consent of the Lessee (per 615 DM 3.9). It is recommended that this report be submitted to the AOSS on a seasonal quarter basis.

2.9 Report of Cessation or Abandonment of Operations

Required by Title 43 CFR 23.10, a report of cessation or abandonment of operations is due 30 days prior to the cessation or abandonment of operations, together with a statement of the exact number of acres of

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* Upon commencement of development operations, collection responsibility transfers to the Oil Shale Supervisor.

land affected by Lessees operations, location, the extent of reclamation accomplished, and other relevant information. The AOSS, probably accompanied by the BLM representatives, will make an inspection to determine whether operations have been carried out in accordance with the approved exploration plan or Detailed Development Plan. The AOSS then must consult with and obtain the concurrence of the authorized officer of such bureau (which would be the BLM in most cases) that has jurisdiction over the land to determine that the operation has been carried out and completed in accordance with the approved exploratory plan or detailed development plan with respect to the surface protection and reclamation aspects of such plan before releasing the performance bond.

3.0 INSPECTIONS

This section describes eight inspections 30 CFR 231 and 43 CFR 23 imposed upon the AOSS. Two of the inspections require twice-monthly tract visits; it is assumed that they can be performed simultaneously. Three of the inspections are performed periodically depending upon a notice given by a Lessee. The three remaining inspections deal with Lessee books of accounts; for one, the audit, the AOSS will require specialized accounting support.

Many ad hoc inspections will probably be performed by various state and local citizens as well as federal officials. It is imperative that the AOSS perform his required inspections vigorously so that issues raised during ad hoc inspections do not come as a surprise to him. In this regard, Lessees should list in their Quarterly Progress Reports all official visitors during the reporting period.

The following sections describe the types of inspections to be performed by the AOSS. Where a frequency of inspection is not precisely defined, recommendations are submitted.

3.1 Operations Inspection

This inspection is required by 30 CFR 231.3. Its purpose is to insure that the terms of the lease and the requirements of the Exploration/Detailed Development Plan are complied with. The focus of the inspection is to prevent waste of minerals or damage to other resources affected by the operations. Typical areas of interest during the inspection would be overburden processing, mining, shale processing, waste disposal, roads, pipelines, construction, fire control, security, scenic values, revegetation, wildlife management, and so on. It is recommended that this inspection be performed on an average of every other week.

3.2 Air/Water Management Inspection

This inspection is required by 30 CFR 231.3. It supplements the activities examined under the Operations Inspection. According to the regulation, the AOSS must examine "exploratory and mining operations to determine the adequacy of water management and pollution control measures for the protection and control of the quality of surface and ground water resources and the adequacy of emission control measures for the protection and control of air quality."

This inspection should also be conducted on an average of two times per month (however, as with the Operations Inspection, the activities going on at the site will determine the criticality of this inspection; during initial development, the inspections should be more critical than when production has begun, for example).

3.3 Minerals Production Inspection

Also required by 30 CFR 231.3, this inspection focuses on the minerals produced by the Lessee. The tract coordinator will ensure that records of production will be obtained from the Lessee on a monthly basis (according to Lease Section 7(b), each Lessee will maintain books in which the weight and quantity or quality of oil shale produced is entered). They will be checked so that the AOSS can be advised concerning the adequacy of royalties payments made by the Lessee.

3.4 Rentals/Royalties/Bonding Inspection

As with the Mineral Production Inspection, this inspection is levied on the AOSS to ensure that the Lessees are making their rental and royalty payments on time and in the correct amounts and that they are adequately bonded. Rental payments are paid in advance on the Anniversary Dates at the rate of 50 cents per acre. They are credited against royalty payments. Royalty payments, however, are based upon a more complicated schedule that is tied to the amount of shale oil obtained per ton. Royalties are also due on minerals other than shale oil produced from the leased deposits. Bonding requirements are fixed for various aspects of a Lessee's work; however, bonds may be released at the option of the AOSS.

3.5 Grading and Backfilling Inspection

This inspection, although required by 43 CFR 23.10, is one that the AOSS would perform anyway. Whenever the Lessee completes grading and backfilling in accordance with his Detailed Development Plan or Exploration Plan, the Lessee makes a report to the AOSS. The tract coordinator will perform the inspection, assisted by whatever AOSS specialists he feels are necessary. This inspection can be conducted simultaneously with visits to the tract for other inspections.

3.6 Planting Inspection

As with the previous inspection, the Planting Inspection is required by 43 CFR 23.10; but, it is also a task that the AOSS office would want to perform anyway. A staff specialist will perform the inspection after the Lessee has reported that the planting set out in his Detailed Development Plan or Exploration Plan has been accomplished. The inspection should be made after the completion of the first full growing season (appropriate to the plants involved) and will focus on whether a satisfactory growth has been established.

3.7 Surface Protection and Reclamation Inspection

Required by 30 CFR 231.3 upon receipt of a Lessee's notice of interest to cease or abandon the leasehold, this inspection is performed by the AOSS to determine whether the terms and conditions of the Lease have been complied with and when the lands have been properly conditioned for abandonment.

3.8 Audits

Per 30 CFR 231.62, an audit "may be made annually or at such other times as may be directed by the (AOSS), by certified public accountants, and at the expense of the Lessees." Standardized procedures should be followed in selecting the firm to do the auditing and one of the assurances the AOSS must be given is that the firm selected meet all Department requirements for audits of this type.

4.0 MEETINGS

Two types of meetings are discussed here: those the Lessees hold with the AOSS, and those the OSEAP conducts.

4.1 Monthly Coordination Meetings

The AOSS presently conducts separate meetings each month with the three Lessees. These are held at Lessee facilities to ensure the availability of Lessee specialists as needed during the meetings. The agendas are presently set by the AOSS and the Lessees and attendance is restricted. These meetings are held to show the progress of the Lessees, to talk over problems and differences of opinion, and to discuss future plans. However, it is recommended that the Lessees deal immediately with the AOSS and his tract coordinators on matters of importance, rather than waiting for a monthly progress meeting.

Minutes of each meeting should be kept with each participant receiving a copy. Handouts should be properly labeled so no confusion as to the origin occurs at a later date. It would also be a good idea to have at least one item on the agenda to address some facet of the baseline collection/monitoring program effort.

Because items of interest arise involving off-tract lands under the jurisdiction of the BLM, the BLM is included as a participant in the monthly coordination meetings. In this manner topics of mutual interest to the AOSS, Lessees, and BLM are discussed.

4.2 OSEAP Meetings

By charter, the OSEAP meets quarterly and meetings usually extend over several days. These meetings are open to the public (as space will allow) and are scheduled in different locations in Colorado and Utah to provide as much local coverage as possible. Departmental Manual 615 DM 3 describes OSEAP responsibilities and the makeup of the memberships.

Since the Panel was created to advise the AOSS on environmental matters, the Lessees should be aware of the Panel meetings and submit items to the AOSS for inclusion on the meeting agenda. Furthermore, the OSEAP and/or the AOSS may request the Lessees to make presentations to discuss and/or explain issues of an environmental concern. The Lessees also may seek advice from the Panel through the AOSS about environmental matters which may pose problems at a future time.

APPENDIX II-1

DETAILED DEVELOPMENT PLAN

OUTLINE

The Detailed Development Plan outline presented in Appendix II-1 is subject to editing by the Area Oil Shale Supervisor. Review comments by the AOSS's staff, the Lessees, and Oil Shale Environmental Advisory Panel are the basis for alterations to the DDP outline presented here. The Area Oil Shale Supervisor is ultimately responsible for the final version of the Detailed Development Plan outline.

OUTLINE FOR PREPARATION OF DETAILED DEVELOPMENT PLANS

1.0 INTRODUCTION

- 1.1 Objective of Oil Shale Prototype Program
- 1.2 Requirement for Detailed Development Plans
- 1.3 Pruposes of Detailed Development Plans
- 1.4 Exploration Plans and Base Line Data Reports
- 1.5 Background
- 1.6 Outline

2.0 DESCRIPTION OF THE PROJECT AREA

- 2.1 Characteristics of Areas to be Utilized

3.0 DEVELOPMENT OBJECTIVES, OVERVIEW AND SCHEDULE

- 3.1 Objectives
- 3.2 Overview
- 3.3 Schedule

4.0 DEVELOPMENT PLAN

- 4.1 Mining Plan
- 4.2 Processing and Upgrading Plan
- 4.3 Overburden Disposal Plan
- 4.4 Spent Shale Disposal Plan
- 4.5 Water Supply and Discharge Plan
- 4.6 Utilities Plan
- 4.7 Transportation Plan
- 4.8 Pipeline Plan
- 4.9 By-Product Plan
- 4.10 Tract Construction Plan
- 4.11 Manpower
- 4.12 Schedule for the Planning, Exploration and Development Operation

5.0 OPERATING PLAN

- 5.1 Mining
- 5.2 Processing and Upgrading
- 5.3 Overburden Disposal
- 5.4 Spent Shale Disposal
- 5.5 Water
- 5.6 Utilities
- 5.7 Transportation
- 5.8 Pipelines
- 5.9 By-Products

5.0 OPERATING PLAN (Continued)

- 5.10 Tract Construction and Maintenance
- 5.11 Manpower
- 5.12 Schedule of Operations

6.0 DECOMMISSION OR ABANDONMENT PLAN

- 6.1 Mine
- 6.2 Processing and Upgrading Facilities
- 6.3 Overburden
- 6.4 Spent Shale
- 6.5 Water
- 6.6 Utilities
- 6.7 Transportation Facilities
- 6.8 Pipelines
- 6.9 By-Products Facilities
- 6.10 On-Site Buildings
- 6.11 Manpower
- 6.12 Schedule of Decommissioning

7.0 DUE DILIGENCE

- 7.1 Project Management Plan

8.0 ENVIRONMENTAL CONTROLS

- 8.1 Pollution - Water
- 8.2 Pollution - Air
- 8.3 Pollution - Noise
- 8.4 Historic and Scientific Values
- 8.5 Scenic Values
- 8.6 Fire Prevention and Control
- 8.7 Health and Safety
- 8.8 Oil and Hazardous Materials

9.0 MONITORING PROGRAM

- 9.1 Requirement for Monitoring
- 9.2 Continuity of Monitoring
- 9.3 Types of Monitoring
- 9.4 Projection of Impacts
- 9.5 Parameters to be Measured

10.0 FISH AND WILDLIFE MANAGEMENT PLAN

- 10.1 Basic Management Plan Requirements
- 10.2 Base Line Data Requirements
- 10.3 Expected Impact of Oil Shale Operations on On-Tract and Off-Tract Areas
- 10.4 Mitigating Actions

11.0 REHABILITATION AND REVEGETATION PLANS

- 11.1 Erosion Control and Surface Rehabilitation Plan
- 11.2 Stabilization of Disturbed Areas
- 11.3 Water Impoundments, Overburden, Stockpiling Plans
- 11.4 Revegetation Plan (Pursuant to Sec. 11(L) of the Environmental Stipulations)
- 11.5 Research (if any) Planned to Establish Additional Technology to Accomplish Rehabilitation and Revegetation

12.0 REPORTING AND INTERFACING WITH OTHER AGENCIES

- 12.1 Reports Required by 30 CFR 231
- 12.2 Reports Required by 43 CFR 23

13.0 COMPLIANCE WITH OTHER LEASE PROVISIONS

- 13.1 Water Rights Developed and Assigned
- 13.2 Schedule for Submission of Investment and Operating Cost Reports
- 13.3 Compliance with Employment Practices Provision, Sec. 18 of Lease
- 13.4 Equal Opportunity Clause and Non-Segregation of Facilities Compliance
- 13.5 Development of the Leased Tract with Maximum Conservation of Resources Consistent with Other Requirements of the Lease and Direction by the Oil Shale Supervisor

14.0 CAPITALIZATION

15.0 APPENDIX: ALTERNATIVES AND SELECTION RATIONALE

- 15.1 Mining
- 15.2 Processing and Upgrading
- 15.3 Overburden and Processed Shale
- 15.4 Water Supply and Discharge
- 15.5 Utilities
- 15.6 Transmission and Pipelines

OUTLINE FOR PREPARATION OF DETAILED DEVELOPMENT PLANS

1.0 INTRODUCTION

1.1 Objective of Oil Shale Prototype Program

The objective of the prototype oil shale leasing program is to provide a new source of energy for the nation by encouraging the development of oil shale mining and processing technology on a commercial scale by private enterprise in a manner that will ensure adequate protection of the environment of the areas for which leases are issued and of other areas affected by activities on the leases, and will ensure the maximum feasible restoration of all disturbed areas upon the termination of operations.

1.2 Requirement for Detailed Development Plans

Each lease entered into under this program requires the Lessee to file with the Area Oil Shale Supervisor on or before the third Anniversary Date of the lease a Detailed Development Plan which shall include: (1) a schedule of the planning, exploratory, development, production, processing and reclamation operations and all other activities to be conducted under the lease; (2) a detailed description pursuant to 30 CFR Part 231 and 43 CFR Part 23 of the procedures to be followed to assure that the development plan, and lease operations thereunder, will meet and conform to the environmental criteria and controls incorporated in the lease; and (3) a requirement that the Lessee use all due diligence in the orderly development of the leased deposits, and, in particular, to attain, at as early a time as is consistent with compliance with all the provisions of the

lease, production at a rate at least equal to the rate on which minimum royalty is computed under the lease.

Prior to commencing any of the operations under the Development Plan in the leased lands, the Lessee must obtain the Area Oil Shale Supervisor's approval of the Detailed Development Plan.

1.3 Purposes of Detailed Development Plans

The Detailed Development Plan (DDP) prepared by each Lessee will serve as documentation for: (1) program planning by the Lessee; (2) disclosure of the manner in which the Lessee intends to develop the leased tract and surrounding areas; (3) prediction of environmental impacts of operations under the lease; and (4) approval of the intended development activities by the Area Oil Shale Supervisor (AOSS).

1.3.1 Program Planning. Orderly development of a lease will require the Lessee to analyze and understand the purposes and constraints of the prototype program, and to plan, program and schedule the detailed operational tasks which must be performed to ensure successful implementation.

1.3.2 Disclosure. The DDP, as prepared by the Lessee, will be disseminated among Federal, State and local government agencies and the public. The Oil Shale Environmental Advisory Panel will make suitable recommendations to the AOSS on environmental aspects of the DDP.

1.3.3 Environmental Impacts. For each phase of development activities described in pertinent sections of the DDP, lessees should provide a prediction of the environmental impact of the proposed

activities. This descrption of projected impact should be sufficient for the purposes of allowing the AOSS "to consider both technical and environmental provisions of the plan" [for] proposed development pursuant to Section 10 of the lease.

In describing the continuing monitoring program pursuant to Section 9 of the DDP outline, the lessee will propose specific parameters to be measured for the purpose of verifying compliance with all lease environmental stipulations, all existing applicable Federal, State and local environmental regulatory requirements, and conformity or nonconformity of actual operations with the environmental impacts projected in the DDP.

1.3.4 Approval. Formal approval of the DDP by the AOSS will be a prerequisite to any development operation on the leased tract carried out by the Lessee. The AOSS will assure himself by analysis of the DDP that the proposed operational tasks and the overall development program are consistent with sound engineering and environmental practices that will satisfy the purposes of the prototype program. This shall include development of a commercial oil shale industry by private enterprise, due diligence by the Lessee for attainment of shale oil production on a practical scale, avoidance and, where necessary, mitigation of adverse environmental impacts, and reclamation of all areas affected by operations on or peripheral to the leased tract to a condition consistent with the terms of the lease.

Included among the tasks making up the proposed program will be environmental monitoring and reporting procedures which will permit the AOSS to make informal judgments as to whether the activities actually performed by the Lessee meet the goals and criteria established by the DDP. The data structure within which environmental parameters are recorded must be such as will facilitate comparisons among baseline status, plans and performance.

1.4 Exploration Plans and Baseline Data Reports

Each Lessee is required to prepare quarterly baseline data reports and a report covering two years of environmental observations and sampling designed to determine, in quantitative terms, the condition of the leased area before commencement of development operations. These reports will serve as the basis for developing the DDP and, subsequently, for evaluating the Lessee's performance in avoiding where possible and mitigating where necessary the adverse environmental impacts of his activities, and in restoring the leased and other affected areas after termination of production.

Before commencing the collection of baseline data, each Lessee was required to file an Exploration Plan describing the activities required to collect the data, and to secure approval of this plan by the AOSS. As baseline data collection has proceeded, changes in the Exploration Plans have been necessary, and these changes, in turn, have required approval by the AOSS before implementation. The approved Exploration Plans, as amended, constitute a body of requirements and

specifications for direction of the Lessee's baseline data collection activities.

The environmental data collected, analyzed and reported as required by an approved DDP will be compared with the data contained in the Baseline Data Reports. This requires that the monitoring and reporting procedures carried out pursuant to an approved DDP be compatible with those under the Baseline Data Reports, and that baseline data collection and data collection under the DDP be integrated into one continuous monitoring and reporting process. The formats developed and approved for the quarterly baseline data reports should be used for the two-year baseline data report and for reporting data collected under the DDP and included in annual progress reports. The parameters reported on should be consistent through these reports.

1.5 Background

Requirements for the DDP are those contained, explicitly or by reference, in the lease entered into between the United States and each Lessee. Requirements of Federal, State and local statutes and regulations are incorporated by reference. Federal interpretation and approval powers are vested in the AOSS and the Secretary of the Interior.

Under the provisions of Section 102(2)(c) of the National Environmental Policy Act of 1969, the Department of the Interior went through the prescribed analytic and consultative process and produced a Final Environmental Statement for the Prototype Oil Shale Leasing

Program, published in 1973. This statement contains a very large amount of useful data and commentary on the overall program.

The Federal Energy Administration included a section, Potential Future Role of Shale Oil: Prospects and Constraints, in the major national energy policy study, Project Independence Blueprint, published by FEA on June 3, 1974. This study is valuable for placing the prototype oil shale project in context.

1.6 Outline

The remainder of this document constitutes a minimal outline of the topics to be included in a DDP that must be prepared by each Lessee and approved by the AOSS prior to commencement of development activities. The outline is intended to assist the Lessee in preparing an acceptable DDP and to facilitat e its review and approval by the AOSS. Each Lessee may, of course, go beyond the minimal topics described here and may alter the order and depth of presentation.

2.0 DESCRIPTION OF THE PROJECT AREA

Each Detailed Development Plan should include a thorough description of the leased area and other areas likely to be affected by project activities. The description should include, but not be limited to, the points discussed below. Appropriate maps, photographs and other graphic presentations should be used.

2.1 Characteristics of Areas to be Utilized

The characteristics of specific sites to be used during development and operation of each lease should be described in detail, including:

2.1.1 Legal Description. A legal description of the leased area and of any off-site land proposed for project use. Description of the land status of each parcel, including ownership of surface and mineral rights.

2.1.2 Location and Size. The location of each tract proposed for project use, relative to readily identifiable topographic or cultural features of the region. The area of each tract and of the total.

2.1.3 Physical Description of the Site. Using appropriate maps and other illustrative materials, and a descriptive text, a detailed description should be prepared of the leased area and other affected areas. This should present a synthesis of topography, geology, hydrology, culture and biology to give a clear and complete description of conditions on all lands to be affected, before development.

2.1.4 Oil Shale Resources. A detailed description of the oil shale resources believed to exist beneath the areas under discussion, including present estimates of their recoverability and commercial value.

2.1.5 Other Mineral Resources. A detailed description of other mineral resources believed to exist beneath the areas under discussion, including present estimates of their recoverability and commercial value.

3.0 DEVELOPMENT OBJECTIVES, OVERVIEW AND SCHEDULE

The DDP should include a concise statement of the objectives of the operation, a summary overview of the activities to be performed during the life of the operation, and a milestone schedule of the tasks to be performed for commercial development and operation of the lease. This portion of the DDP should be capable of standing alone as an executive summary.

3.1 Objectives

The objectives of each operation should be similar to and compatible with the goals and objectives of the Prototype Oil Shale Program, made site-specific. They should include development, production, decommissioning, monitoring, environmental impact mitigation and reclamation objectives.

3.2 Overview

The overview should cover anticipated planning, exploratory, development, production, processing, reclamation and monitoring activities, and should refer to and be coordinated with the time schedule discussed in the next paragraph. The overview should contain sufficient detail so that a reader who is unfamiliar with the project can obtain a good, overall understanding of the activities which are proposed.

3.3 Schedule

A time-phased critical path chart (pert chart) or equivalent graphic presentation of the timing and interdependence of development and operation tasks should be included in the DDP.

Time-phased estimates should be included of the production levels of shale oil and other valuable minerals; of the oil shale processed and processed shale disposed of; of the production, consumption and disposal of water; and of consumption of other resources and processing agents.

Sufficient descriptive discussion should be included to make the schedule and the overview an understandable description of the proposed development, operation and reclamation activities.

4.0 DEVELOPMENT PLAN

The DDP should contain sufficient detail to allow a thorough evaluation of anticipated development and operating activities.

4.1 Mining Plan

4.1.1 Requirement. A detailed mining plan should be prepared in compliance with:

- Lease stipulations;
- 43 CFR Part 23 - Surface Exploration Mining and Reclamation of Lands; and
- 30 CFR Part 231 - Operating Regulations for Exploration, Development and Production.

4.1.2 Contents. The mining plan should include the following items:

- A description of the location and areas to be affected by mining operations;
- Suitable maps and/or aerial photographs showing the topography of the mine areas, the anticipated location of all shafts, entrances, etc., and the location and size of all facilities associated with mining operations;
- A detailed description of the anticipated method(s) of mining to be employed on tract.

- If pilot-mining is to be employed, in order to assess such problems as dewatering, pillar sizes and strength, fracture patterns, etc., a description of the nature, location, and extent of such activities;
- Location and identification of shale strata to be mined, and projected rate of mining output and overburden removed (if any);
- Description of anticipated mine development.

  For underground mining, this should include: estimated number and location of adits, shafts, ventilation openings, bench and room-and-pillar layouts; barrier pillars, anticipated dewatering; consumptive water requirement; type of ground support; haulage and access roads needed; explosives and methods of use; types and sizes of underground equipment, safety provisions;

  For open pit mines: anticipated schedule for overburden and waste removal, and method of disposal or storage; chronological development scheme for the pits, number and types of mining machinery and explosives to be employed; sequence of operations; access roads required;
- Environmental controls to be employed, including: provisions for control of dust from drilling, blasting, haulage, emission of particulates from mine openings; reduction in mine fumes (NO_x, CO, SO_x, HC,) from diesel engines; clearing of blasting and welding fumes; methods of mine water control; prevention of explosive gas mixtures.

- Plan for control of cutting and removal of vegetation, to insure that only such land is cleared and stripped as is necessary for mining, processing, disposal, access and other approved operations under the lease. Felling, clearing, grubbing, chipping and disposal of vegetation should be so conducted as to minimize adverse environmental impacts and to facilitate soil stabilization and vegetation.
- A detailed description of mine safety plans, consistent with the requirements of the Mining Enforcement and Safety Administration, the Occupational Safety and Health Administration, and any specific variations essential to the operation of the lease.

4.2 Processing and Upgrading Plan

The processing plan should address in detail the following items:

- Detailed plot plans of the technical sequences selected for processing the mined oil shale to final, marketable products. This should include the following: location (with topographic contour maps) of all planned crushing, retorting, and upgrading facilities on the tract; planned raw shale and processed shale stockpiles, product and by-product storage facilities (for shale oil, sulfur, ammonia, coke, etc.), water and fuels storage areas; routes of plant roads, utility lines (power, water, outside fuels) and product pipelines;

- Flow diagrams and detailed descriptions of processing sequences, including: primary and secondary crushing; retorting; partial refining (if used) and production of by-products, shale ash cooling and transport to disposal sites; gas recovery and treating units; foul water stripper units; sulfur recovery units, etc.;
- Overall material balances for the processing sequences, and for the major individual steps involved (e.g., crushing, retorting, upgrading, by-products production); balances to include atmospheric emissions (e.g., particulates, SO_x, NO_x, HC, CO), and dissolved or suspended materials in any process waters requiring treatment; and
- Anticipated start-up schedule for the crushing, retorting, and upgrading plants, and other facilities until entire facility is on-stream at planned capacity.

4.3 Overburden Disposal Plan

The overburden disposal plan should address in detail the following items:

- Known physical and chemical characteristics of overburden from open pit operations, or initial wastes from underground mine development; disposal site(s) and site preparation; methods of conveyance and disposal; quantities involved; and disposal areas required. Plans (if any) for return of overburden or wastes to pit; and

- Provisions for mitigating environmental impact(s) of overburden and waste disposal operations, including: methods of stabilizing disposal piles, to insure minimum erosion and maximum stability to control contamination of adjacent water by pile leachates; plans for temporary or permanent revegetation of disposal piles (types of vegetation, water and fertilizer requirements); plans for preserving existing natural drainages including diversion structures, if any; extent of "semi-perpetual care". Engineering criteria to insure slope stability should be displayed.

4.4 Spent Shale Disposal Plan

The spent shale disposal plan should address in detail the following items:

- Physical and chemical characteristics of spent shale from retorting operations, including percent carbonaceous residue, particle size distribution, anticipated compaction and percent water required; methods of conveyance and disposal; selected disposal site (including partial return to mine); and
- Provision for mitigating environmental impact(s) of spent shale disposal including: stabilization of disposal pile(s); provision for control of leachates (if any); plans for surface reclamation, including shaping and revegetation (types, water and fertilizer requirements, years of "care" to insure self-sufficiency).

4.5 Water Supply and Discharge Plan

4.5.1 Water Supply Requirements. Impounded and water treatment requirements should be specified in as great detail as possible. Mine dewatering should be treated as particular subsurface source.

4.5.1.1 Definitions. The following definitions are used in this section:

- Quality of a supply source will mean the composition of the water from that source, as determined by chemical and biological analyses, including potentially dangerous trace constituents.
- Specific sectors for water requirements will include: mining, processing, spent shale disposal and reclamation.

4.5.1.2 Consumptive Requirements. The consumptive requirements for water, by quality and quantity, by specific sector of operations and time of use, should be estimated.

4.5.1.3 Discharge Requirements. The requirements for discharge of water, by quantity and quality, by specific sector of operations and time of use, should be estimated.

4.5.1.4 Available New Water. Presently known and available sources of supply should be described by quantity, quality and percentage of contribution to total requirements. These sources should be classified as:

a) Surface

b) Subsurface

1) Tributary water

2) Non-tributary water

(Indicate points of diversion or well heads)

c) Off-site or On-site

4.5.1.5 Purchase Water. Presently known sources of supply which have or may become available by purchase should be described. The estimated cost of this water, if purchased, from first, second or third increments and the average costs should be described. It should be specified, in each case, whether water will be purchased with the land or without the land, and from what present uses will this water be diverted.

4.5.1.6 Other Water. Water supplies anticipated to be derived from application of eminent domain or other federal power should be described.

4.5.2 Water Discharge Requirements.

A description of the quantity and type of any anticipated aqueous effluents which are to be discharged, either to the surface or underground, from the mine or plant complex, including the chemical, biological, and toxic nature of dissolved and suspended materials contained

therein, and potentially dangerous and unacceptable trace constituents, should be given. The affected aquifers in each case should be described.

4.5.2.1 Supply and Discharge System Design. A design(s) should be specified for the conveyance and any necessary impoundment, supply treatment, and effluent control facilities for all waters used or encountered in connection with the project, the purpose of which is to minimize soil erosion and sedimentation, and to prevent the pollution of any receiving waters or reinjection wells. Corridor designation requirements should be specified. Storage requirements should be detailed showing locations, capacities, etc. All designs are to comply with applicable State and Federal standards, including those for injection wells.

4.5.2.2 Wetting Spoil Piles. If discharged plant or mine effluents are to be used to wet and compact processed (spent) oil shale surface or underground disposal piles, a description of the methods to be employed, including quantity and nature of effluent, degree of pile compaction, and expected leachates (if any) therefrom, their control (e.g., coffer dams) and treatment. The toxic nature of any residuums in or in such spoil piles are to be described, including any hazard posed to associated plants and animal life.

4.5.2.3 Aqueous Spills. A description of proposed spill contingency plans for spills of aqueous plant or mine effluents, as defined in Section 311 (a) (14) of the Federal Water Pollution Control Act, and in conformance with 36 F.T. 16215 (August 20, 1971), should be included.

4.5.3 Alternatives

Alternatives planned in the event sources of supply and means of discharge, as outlined above, are found not to be available should be included where appropriate.

4.6 Utilities Plan

4.6.1 Electric Power Plan. A description of the required electric load schedule for the entire shale complex, including the mine, crushing, and all process units should be given. This description should include:

- Sources of power, including plans for substations and route(s) of transmission lines if outside utility is used. Provisions for duplicate transmission facilities and standby power, and reliability requirements,
- A description of any on-site power generation facilities, including type, capacity, fuel source, cooling water requirements, capital investment,
- Predicted impact of a power failure upon plant and mine operations,
- Conformance of above to "Environmental Criteria for Electric Transmission Systems", U.S. GPO No. 0-404-932, 1970.

4.6.2 Communications Plan. A description of anticipated communications facilities, including telephone, radio, closed-circuit TV, etc., should be given, including anticipated route of telephone transmission lines.

4.6.3 Potable Water Supply Plan. A description of provisions for the potable water supply for the mine and plant, including source, quantity, treatment required, and quality of resulting potable water, should be included.

4.6.4 Sanitary Sewage Disposal Plan. A description of plans for treatment of sewage from the plant site and mine areas, including quantities involved, methods, characteristics of resulting product, sludges and effluents, and end-use (or disposal sites) for such products should be given. If used on processed shale piles, a description of resulting environmental impacts should be provided.

4.6.5 Heating Fuel Supply and Storage. Sources of gas and liquid fuels for the plant and mine, during start-up and on-stream operation, and the quality and quantity of each required, should be specified. If outside fuels are to be purchased, a description of such fuels, their source, and quantities required should be included. Storage facilities, including design of spill prevention measures, should be specified.

4.7 Transportation Plan

The transportation plan should include the following items.

4.7.1 Corridors. A complete description of all transportation and utility corridor plans along with proposed shared corridors.

4.7.2 Roads and Trails

- Description of all existing and planned roads and trails.
- Road surfacing plans and impact on air and water.
- Natural barriers.
- Regulation of public access.
- Crossings
- Specifications for fences and cattleguards.
- Alternate routes.
- Provisions or plans for off-road vehicle use.

4.7.3 Personnel Transportation. Plans for personnel transportion on and to and from site.

4.7.4 Construction Materials. Plans for transportation of construction material and equipment to and from site.

4.7.5 Operating Materials and Equipment. Plans for transportation of operating materials and equipment to and from site.

4.8 Pipeline Plan

The pipeline plan should include the following items:

4.8.1 Plans for the Construction and Operation of All Pipelines into and out of Tract, including:

- Construction standards.
- Safety standards.

- Shut-off valve type and location.
- Pipeline corrosion protection.
- Size of line and material carried.
- Operating characteristics.

4.9 By-Product Plan

A plan should be given for the extraction, processing and transportation of any by-product materials, including ammonia and associated nahcolite and dawsonite.

4.10 Tract Construction Plan

The tract construction plan should include the following items:

4.10.1 Housing. A description of the number and size, location and type of housing to be constructed on the tract.

4.10.2 Building. A description of all building to be constructed on the tract, including size, material, number, type, location and purpose.

4.10.3 Sanitation. A description of procedures to be employed in handling on-tract wastes, not covered in other sections.

4.10.4 Materials. A description of all material required for on-tract construction not covered in other sections, including wastes specified in Section 14 (B) of the Oil Shale Lease Environmental Stipulations.

4.11 Manpower.

A schedule showing the number of men to be employed on the project as a function of time during the development phase of the operation, including a skills matrix.

The number of men and families housed on-tract as a function of time should be given.

4.12 Schedule for the Planning, Exploration and Development Operation

A detailed time schedule should be prepared for all the essential tasks to be accomplished during the period of planning and development. The following items should be included:

4.12.1 PERT network diagram.

4.12.2 Schedule with critical paths.

4.12.3 Schedule of progress reports and milestones.

5.0 OPERATING PLAN

The operating plan should address all of the subjects contained in Section 4.0, but from the standpoint of operating the facilities over the expected life of the operation. Those areas or subjects discussed in the development section which are not applicable to the operating plan should be clearly labelled as such. Any new areas or subjects which are added to Section 5.0, and not covered in Section 4.0, should also be clearly labelled as such. The following sections should be included:

5.1 Mining

5.2 Processing and Upgrading

5.3 Overburden Disposal

5.4 Spent Shale Disposal

5.5 Water

5.6 Utilities

5.7 Transportation

5.8 Pipelines

5.9 By-Products

5.10 Tract Construction and Maintenance

5.11 Manpower

5.12 Schedule of Operations

6.0 DECOMMISSION OR ABANDONMENT PLAN

The decommission plan should address all the subject areas contained in Section 5.0 of the operating plan. Those areas which are not applicable should be clearly labelled. Any part of the operation which will be abandoned or decommissioned prior to the termination of the operation should be specifically identified. The following items should be included.

6.1 Mine

6.2 Processing and Upgrading Facilities

6.3 Overburden

6.4 Spent Shale

6.5 Water

6.6 Utilities

6.7 Transportation Facilities

6.8 Pipelines

6.9 By-Products Facilities

6.10 On-site Buildings

6.11 Manpower

6.12 Schedule of Decommissioning

7.0 DUE DILIGENCE

Section 10 of the Lease imposes "a requirement that the Lessee use all due diligence in the orderly development of the Leased Deposits and, in particular, to attain at as early a time as is consistent with compliance with all the provisions of this lease, production at a rate at least equal to the rate on which minimum royalty is computed under Section 7(e)(1)."

For purposes of the DDP, the due diligence requirement indicates that the Lessee should describe (per the outline below) how he plans to manage the development activities he describes in other parts of the DDP in order to meet production levels, as specified in the Lease. As part of the annual progress reporting procedure, the Lessee should update this material. Beginning with the annual progress report for Lease Year six, however, compliance or non-compliance, and the reasons therefor, with the production rates set out in Section 7(e)(1) should be reported.

7.1 Project Management Plan

7.1.1 Key Project Personnel

7.1.2 Organizational Chart and Functional Responsibility

- Offices of Primary Responsibility (Technical, Legal, Financial, Administratative)
- Technical Accountability (Data Storage and Availability, Internal Review Process, Confidentiality)

7.1.3 Additional Project Staff

7.1.4 Consultants

Names, addresses and qualifications of all professional scientists, engineers, lawyers, title companies and other professional consultants not in the direct employ of the Lessee, whose advice has been relied upon for information supplied in the DDP.

7.1.5 Project Office Locations

7.1.6 Corporate Organizational Support

- Statements of Parent Corporation Commitments
- Representation on Project Staff
- Specialized Support to be Provided

7.1.7 Review of Program to Date

7.1.8 Detailed Schedule of Activities (Gant Chart)

- Contracts for Equipment or Services
- Realty Acquisitions
- Development Milestones

8.0 ENVIRONMENTAL CONTROLS

The DDP should include, in quantitative terms, the environmental regulatory standards or requirements to be met for each medium and pollutant. Each technological step required for the development and operation of the project should be described, and the anticipated emissions listed. Detailed plans should be included for the steps to be taken in each case by the Lessee, to comply with the above-enumerated standards or requirements. At a minimum, the following areas should be covered:

8.1 Pollution - Water

8.1.1 Water quality control plans

8.1.2 Disturbance of existing waters

8.1.3 Locations and construction of crossing of perennial streams

8.1.4 Statement of compliance with Federal, State and local water pollution control regulations and standards

8.2 Pollution - Air

8.2.1 Control plans

8.2.2 Statement of compliance with Clean Air Act (4-USC para. 1857-1857-1)

8.2.3 Statement of compliance with State and local Air Pollution Control Regulations and Ambient Air Quality Standards

8.2.4 Dust control plans; including those for transportation and disposal of overburden and spent shale

8.2.5 Burning control plans

8.3 Pollution - Noise

8.3.1 Compliance with standards - monitor future impacts

8.4 Historic and Scientific Values

8.4.1 Report of archaeological investigations and Leased Lands

8.4.2 Plans for protection of objects of antiquity, historic, prehistoric or scientific interest

8.5 Scenic Values

8.5.1 Statement of compliance with standards in the stipulations

8.5.2 Consideration of aesthetic values

8.5.3 Plans for protecting the landscape

8.5.4 Standards for signs

8.6 Fire Prevention and Control

8.6.1 Vegetative fire prevention and suppression plans

8.6.2 Compliance with codes on handling transportation, storage, use and disposal of flammable liquids

8.6.3 Plans for prevention of oil shale outcrop fires

8.6.4 Fire fighting plans and equipment

8.7 Health and Safety

8.7.1 Health and safety protective measures

8.7.2 Statement of compliance with the Federal Metal and Non-metallic Mine Safety Act of 1966 (30 USC para. 721-740)

8.7.3 Statement of compliance with the Occupational Health and Safety Act of 1970 (29 USC para. 651-678)

8.7.4 Statement of compliance with Public Law 91-425, October 15, 1970 (18 USC para. 841-848) and 26 CFR 181 relating to explosives use

8.8 Oil and Hazardous Materials

8.8.1 Spill contingency plans and conformance to the National Oil and Hazardous Substances Pollution Contingency Plan, 36 FR 16215, August 20, 1971 and Federal Water Pollution Control Act, 36 USC 1151, et seg.

8.8.2 Storage and handling plans for oil, petroleum products, industrial chemicals and toxic or volatile materials.

8.8.3 Plans for use of pesticides and herbicides

9.0 MONITORING PROGRAM

9.1 Requirement for Monitoring

The Lessee is required by the provisions of the Lease to "avoid, or, where avoidance is impractical, minimize and, where practicable, repair damage to the environment...." He is required to "conduct all operations under this Lease in compliance with all applicable Federal, State and local (environmental) statutes, regulations and standards." He is required to include in the DDP, "A detailed description...of the procedures to be followed to assure that the development plans, and Lease operations thereunder, will meet and conform to the environmental criteria and controls incorporated in the Lease." Finally, he is required to "conduct a monitoring program before, during and subsequent to development operations."

The monitoring program should be designed and implemented in such a way that the Lessee can know what the impacts of his operations and the results of his mitigative activities are, and can show the Area Oil Shale Supervisor that the requirements spelled out above are being met.

9.2 Continuity of Monitoring

Each Lessee has instituted a program of environmental monitoring based on Exploration Plans approved by the AOSS, and a series of quarterly baseline data reports based on that program. The data gathered and reported through these activities will be used to develop the DDP, and will be aggregated and analyzed into a baseline data

report, submitted in parallel with the DDP, which will serve as a detailed description of the environmental condition of the areas anticipated to be affected by operations under the Lease, before those operations commence. The environmental monitoring conducted during and after the Lease operations, will be a continuation of that conducted for baseline purposes before the commencement of operations, as modified from time to time by the AOSS. The purpose of this continuity is to ensure that the requirements for avoidance, minimization and repair of environmental damage are met.

9.3 Types of Monitoring

Monitoring conducted under this program should measure instantaneous emissions and ambient conditions, integrated emissions, trends and incidents requiring remedial action.

9.4 Projection of Impacts

The monitoring program should be guided to a considerable extent by the Lessee's projections of the environmental impacts of his activities. Monitoring methods can be applied to measuring the extent to which projections are realized. The alternative to using such projections is to measure all pollutants continuously down to the noise level.

9.5 Parameters to be Measured

The parameters to be measured by the monitoring program described in the DDP should be those approved by the AOSS for baseline data collection and reporting, as amended by the AOSS from time to time during the life of the Lease.

10.0 FISH AND WILDLIFE MANAGEMENT PLAN

10.1 Basic Management Plan Requirements

In accordance with Section 4 (A) of the Oil Shale Lease Environmental Stipulations, "The Lessee shall submit for approval by the Mining Supervisor, a detailed fish and wildlife management plan which shall include the steps the Lessee shall take to:

(1) avoid or, where avoidance is impracticable, minimize damage to fish and wildlife habitat, including water supplies; (2) restore such habitat in the event it is unavoidably destroyed or damaged; (3) provide alternate habitats; and (4) provide controlled access to the public for the enjoyment of the wildlife resources on such lands as may be mutually agreed upon."

The plan should include consideration of the Wildlife and Grazing Guidelines (September 23, 1974) developed by the Oil Shale Environmental Advisory Panel.

10.2 Baseline Data Requirements

The Lessee should identify, determine the approximate number, and migratory patterns, if any, of all wildlife and fish species in the area likely to be affected by his operations. The Lessee should also determine the present condition, structure, and status of cyclical fluctuations in the population of major species. This data shall be collected at bi-monthly intervals.

The areas or positions at which the sampling is performed and the type of sampling method employed should be recorded by the Lessee.

10.3 Expected Impact of Oil Shale Operations on On-Tract and Off-Tract Areas

The Lessee should estimate the effect, both direct and indirect on:

- Destination of natural habitats (Due to construction of mining facilities and employee housing, access roads, etc.)
- Interruption of migratory patterns and seasonal activities.
- Faunal stress - due to increased noise levels.
- Reduction of water quality and level, as it might affect wildlife.
- Reduction of air quality, as it might affect wildlife.
- Impact (quantitative and qualitative) of herbicides and pesticides on all species.
- Impact (quantitative and qualitative) or urbanization on all species.
- Impact on rare, protected or endangered species.

10.4 Mitigating Actions

The Lessee should describe in detail the actions he plans to take to mitigate adverse effects on fish and wildlife. The following areas should be considered:

- Food potential
- Water availability
- Water Quality
- Land Uses
- Controlled recreational uses
- Industrial uses and construction

11.0 REHABILITATION AND REVEGETATION PLANS

The rehabilitation and revegetation plans should at a minimum conform to Section 11 of the Lease Stipulations and to the Guidelines Relative to Surface Disturbance and Rehabilitation (September 24, 1974) of the Oil Shale Environmental Advisory Panel, as they pertain to the development and operation phases. In addition, the plans for leases in the State of Colorado should be compatible with the requirements of the Colorado Land Reclamation Act and should certify compliance with that Act and attendant regulations. The following areas should be covered:

11.1 Erosion Control and Surface Rehabilitation Plan

- An erosion control and surface rehabilitation plan, related to a projected 100-year precipitation rate of the area, insofar as land disturbances on the tract are concerned.

- Mass movements addressed in the above should include effects of flash floods, mud flows and slides, landslides and rock falls.

- Plans for preservation or diversion of natural stream drainages.

- Conformance of above to 43 CFR, Part 23.

11.2 Stabilization of Disturbed Areas

- Description of plans for stabilization of disturbed areas, including methods of backfilling and grading, details of

- Predicted stability of areas after above treatment, as a function of time

- Conformance to 43 CFR, Part 23.

11.3 Water Impoundments, Overburden, Stockpiling Plans

(See 4.3 and 4.4 Overburden and Processed Shale Disposal.)

11.4 Revegetation Plans (Pursuant to Section 11(L) of the Environmental Stipulations)

- Revegetation plans for all disturbed areas, including species, density, degree of "perpetual care," water and fertilizer requirements; methods of planting, combinations of legumes and trees per acre; seed sources.
- Degree of anticipated stability and self-sustaining capacity of revegataion, and adaption as food for fauna of area.
- A demonstration that revegetation technology is available.
- A description of procedures for reporting progress of revegetation technology program following submission of DDP, if successful technology is not available.
- Examination of any environmental effects resulting from revegetation procedures.
- Conformance with 43 CFR, Part 23, and with State Mine Land Reclamation Board regulations.

11.5 Research (if any) Planned to Establish Additional Technology to Accomplish Rehabilitation and Revegetation.

- Plan to develop necessary rehabilitation and revegetation technology.
- Sources of data and program format.
- Period of time needed to obtain test information and to develop commercial rehabilitation and revegetation technology.
- Integration of rehabilitation and revegetation plan into oil shale project.

12.0 REPORTING AND INTERFACING WITH OTHER AGENCIES

The Detailed Development Plan should present in detail the Lessee's proposed approach to compliance with the requirements of the lease and of applicable laws and regulations with regard to reporting and interfacing with government agencies other than the U.S. Geological Survey. The following items should be considered.

12.1 Reports Required by 30 CFR 231

The requirement in 30 CFR 231 for an Exploration Plan and a Mining Plan will be satisfied by the submission and approval of the Detailed Development Plan as described in this Outline.

12.2 Reports Required by 43 CFR 23

12.2.1 Exploration and Mining Plans

The requirement in 43 CFR 23 for an Exploration Plan and a Mining Plan will be satisfied by the submission and approval of the Detailed Development Plan as described in this Outline.

12.2.2 Operations, Grading and Backfilling, and Planting Reports.

The requirements in 43 CFR 23 for Operations, Grading and Backfilling, and Planting Reports will be satisfied by submission and approval of the annual Progress Reports whose format, content and timing will be specified by the Area Oil Shale Supervisor.

12.2.3 Report of Cessation or Abandonment of Operations.

This report will be submitted as specified by 43 CFR 23.

13.0 COMPLIANCE WITH OTHER LEASE PROVISIONS

The Detailed Development Plan should present in detail the Lessee's proposed approach to compliance with the following provisions of the lease.

13.1 Water Rights Developed and Assigned

13.2 Schedule for Submission of Investment and Operating Cost Reports

13.3 Compliance with Employment Practices Provision, Sec. 18 of Lease

13.4 Equal Opportunity Clause and Non-segregation of Facilities Compliance

13.4.1 Non-discrimination and Posting of Notices

13.4.2 Affirmative Action Program

13.4.3 Employment Advertising

13.4.4 Notices to Unions

13.4.5 Compliance with Executive Order No. 11246 of September 24, 1965

13.4.6 Certification of Non-segregated Facilities

13.5 Development of the Leased Tract with Maximum Conservation of Resources Consistent with Other Requirements of the Lease and Direction by the Oil Shale Supervisor

14.0 CAPITALIZATION

The Detailed Development Plan should include itemized schedules of estimated capital costs, by time period covering:

- Mine complex
- Processing sequence and major individual steps
- Overburden and waste disposal
- Water supply and discharge system
- Access and communications
- Transportation

15.0 APPENDIX: ALTERNATIVES AND SELECTION RATIONALE

Because of the importance of the oil shale development program and because of the nature of the prototype program, it is expedient for evaluation purposes and future reference that the rationale and logic which lead to the selection of the various engineering choices be spelled out in detail. This will allow the Area Oil Shale Supervisor, Federal and State offices and the public to examine the alternatives faced by the Lessees, and to consider the relative weight of technical, environmental and economic considerations on their decisions.

This information will aid the Area Oil Shale Supervisor and the Oil Shale Environmental Advisory Panel in evaluating the detailed development plans.

15.1 Mining

15.1.1 Alternative Mining Systems

- Surface
- Subsurface
- In situ

15.1.2 Selection Criteria

- Technical considerations
- Environmental considerations and Impacts
- Economic considerations

15.1.3 Rationale for Mining Plan Selected

15.2 Processing and Upgrading

15.2.1 Alternative Processing Methods

- Retorting
- Upgrading
- Crushing

15.2.2 Selection Criteria

- Technical considerations
- Environmental considerations
- Economic considerations
- Products and markets

15.2.3 Rationale for Processes Selected

15.3 Overburden and Processed Shale

15.3.1 Alternate Sites

15.3.2 Alternate Handling Methods

15.3.3 Selection Criteria

- Technical considerations
- Environmental considerations
- Economic considerations

15.3.4 Rationale for Processes and Sites Selected

15.4 Water Supply and Discharge

15.4.1 Alternative Sources of Supply

15.4.2 Alternative Sources of Discharge

15.4.3 Selection Criteria

- Technical considerations

APPENDIX II-2

QUARTERLY PROGRESS REPORT

OUTLINE

The Quarterly Progress Report outline presented in Appendix II-2 is subject to editing by the Area Oil Shale Supervisor. A feview by the AOSS's staff is the basis for the alterations to the Quarterly Progress Report outline presented here. The Area Oil Shale Supervisor is ultimately responsible for the final version of the Quarterly Progress Report outline.

QUARTERLY REPORT OUTLINE

I. INTRODUCTION

A. Site Activity

1. Time Period - Season
2. Brief Synopsis of Projects

a. Environmental Baseline Data Projects
b. Core Drilling
c. Pumping Tests
d. Construction
e. Corridor Utilization
f. Others

B. Summary of Future Plans

1. Next Quarter

a. New Studies/Projects
b. Construction
c. Milestones

2. Long Term

a. Scheduled Projects
b. Anticipated Activities

C. Project Activity Associated With Site Work

1. Administrative
2. Interaction with Government
3. Interaction with Others
4. Development

II. ENVIRONMENTAL BASELINE MONITORING PROGRAMS

A. Air Quality

1. Program Summary

a. Monitoring Station Location - Map
b. Required Analysis Chart

i. Components Measured
ii. Location of Measurements

c. Problems Encountered - Down Time

i. Equipment Malfunctions
ii. Air Quality Standards Exceeded
iii. Power Source
iv. Other

d. Accomplishments To Date
e. Future Plans

2. Data Collection

a. Sampling Frequency - Chart
b. Reporting Frequency - Chart

3. Data

a. Chemical and Particulate Data Elements - Tabular Form

i. By Monitoring Station
ii. Dates Collected
iii. Identify Additional/Optional Components
iv. Sample Chart For "Summary Report"

b. Quarterly Summary of Chemical and Particulate Data Elements

i. Average Values
ii. Fluctuations

(1) Daily Max. and Min.
(2) Seasonal Variations
(3) Unexpected/Unexplained Deviations From the Norm

iii. Sample Chart for "Summary Report"

c. Visibility Study

i. Methodology

(1) Techniques
(2) Sampling

ii. Test Results
iii. Sample for "Summary Report"

4. Instrument Calibration

a. Techniques
b. Frequency

B. Meteorology

1. Program Summary

   a. Monitoring Summary

      i. Location - Map
      ii. Hieghts

   b. Required Analysis Chart

      i. Components Measured
      ii. Location of Measurements

   c. Problems Encountered - Down Time

      i. Equipment Malfunctions
      ii. Unusual Weather Conditions
      iii. Power Source
      iv. Other

   d. Accomplishments To Date
   e. Future Plans

2. Data Collection

   a. Sampling Frequency - Chart
   b. Reporting Frequency - Chart

3. Data

   a. Surface and Low Altitude Meteorological Data Elements - Tabular Form

      i. By Monitoring Station
      ii. Dates Collected
      iii. Identify Additional/Optional Components
      iv. Sample Chart for "Summary Report"

   b. Upper Air (200 - 6000 ft.) Study Data Elements By Monitoring Station - Tabular Form

      i. Methodology

         (1) Techniques
         (2) Sampling

      ii. Data Elements
      iii. Test Results
      iv. Sample Chart For "Summary Report"

   c. Atmospheric Diffusion Study Data Elements

      i. Methodology

         (1) Techniques
         (2) Sampling

ii. Data Elements
iii. Test Results
iv. Sample for "Summary Report"

4. Instrument Calibration

a. Techniques
b. Frequency

C. Water Quality and Hydrology

1. Program Summary

a. Test Locations - Map

i. Surface Water (Including Seeps & Springs)

(1) Monitoring Stations
(2) Gauging Stations

ii. Ground Water

(1) Core Hole Samples
(2) Observation Wells

b. Required Analysis Chart

i. Surface Water (Including Seeps & Springs)

(1) Components Measured
(2) Location of Measurements

ii. Ground Water

(1) Components Measured
(2) Locations of Measurements

c. Problems Encountered - Down Time

i. Equipment Malfunctions
ii. Water Quality Standards Exceeded
iii. License/Permits
iv. Gas In Well
v. Dry Streams
vi. Other

d. Accomplishments To Date
e. Future Plans

2. Data Collection

a. Sampling Frequency - Charts

i. Surface Water
ii. Seeps & Springs
iii. Ground Water

b. Reporting Frequency - Charts

i. Surface Water
ii. Seeps & Springs
iii. Ground Water

3. Data

a. Surface Water Data Elements - Tabular Form

i. By Monitoring Station
ii. Dates Collected
iii. Identify Additional/Optional Components
iv. Sample Chart for "Summary Report"

b. Seeps & Springs Data Elements - Tabular Form

i. By Monitoring Station
ii. Dates Collected
iii. Identify Additional/Optional Components
iv. Sample Chart for "Summary Report"

c. Ground Water Data Elements

i. By Observation Well or Core Hole
ii. Dates Collected
iii. Identify Additional/Optional Components
iv. Sample Chart for "Summary Report"

d. Quarterly Summary of Data Elements

i. Source of Water for Analysis

(1) Surface Water
(2) Seeps & Springs
(3) Ground Water

ii. Contents

(1) Average
(2) Fluctuations

(a). Max. and Min.
(b). Seasonal Variations
(c). Unexpected/Unexplained Deviations From the Norm

iii. Sample Charts For "Summary Reports"

4. Instrument Calibration

a. Techniques
b. Frequency

c. Interpretation of Data

2. Lithologic Logs

a. Data Collection

i. Frequency
ii. Location
iii. Method(s) of Collection

b. Data

i. By Well
ii. Logs - Charts - Graphs

c. Interpretation of Data

F. Assays

1. Data Collection

a. Well or Core Hole
b. Interval
c. Assay Techniques for Required Components

2. Data

a. Shale Oil Content
b. Alumina Content
c. Sodium Content

G. Trace Element Analysis

1. Data Collection

a. By Well or Core Hole
b. Drill Cutting or Core

2. Data

a. Required Analysis

i. Arsenic
ii. Antimony
iii. Boron
iv. Cadium
v. Fluorine
vi. Mercury
vii. Selenium

b. Other Trace Element Analysis (As required by Area Oil Shale Supervisor)

H. Rock Mechanics

1. Program Summary
2. Data

a. Geotechnical Log
b. Rock Property Tests

i. Required

(1) Triaxial Compression
(2) Uniaxial Compression
(3) Density Determination
(4) Direct Shear

ii. Additional/Optional

(1) Brazilian Tensile
(2) Point Load
(3) Schmidt Hammer
(4) Other

c. Correlation and Interpretation of Data

I. Gas Analysis

1. Data Collection

a. Frequency
b. Locations
c. Method

2. Data

a. Gas

1. Methane - Required
2. Other Gases (Ethane, Ethylene)

b. Volume
c. Depth Released
d. Contained

i. Fractures and Joints
ii. Groundwater
iii. Pore Spaces

3. Interpretation of Data

J. Well Completion

1. Function
2. Casing
3. Well Completion Diagram

IV. OTHER STUDIES

A. Aerial Photographic Study and Mapping

1. Program Summary

a. Techniques Used
b. Problems Encountered
c. Accomplishments
d. Future Plans

2. Photographs

a. Locations
b. Type

i. Color
ii. Color Oblique
iii. Infrared
iv. Black and White

c. Scales

3. Photo Usage and Interpretation

a. Vegetation Mapping
b. Soil Mapping
c. Surficial Geology Mapping
d. Geologic Joint and Fracture Analysis
e. Design Purposes
f. Other

B. Microenvironmental Program

1. Program Summary

a. Monitoring Station Location - Map
b. Survey Points
c. Components Analyzed
d. Problems Encountered
e. Accomplishments
f. Future Plans

2. Data Collection

a. Sampling Frequency
b. Reporting

3. Data

a. Physical Parameters
b. Chemical Properties

4. Interpretation of Data
5. Instrument Calibration

    a. Frequency
    b. Techniques

C. Revegetation - Reclamation Studies

1. Program Summary

    a. Monitoring Stations/Plots - Map
    b. Methodology
    c. Problems Encountered
    d. Accomplishments
    e. Future Plans

2. Data

    a. Erosion Control
    b. Surface Stabilization
    c. Wildlife Support
    d. Successive Natural Events
    e. State of the Art Procedures
    f. Pertinent Local Biological Data
    g. Evaluations of Species in Plots

        i. Growth
        ii. Vigor
        iii. Stand Density

3. Recommendations for Seeding Disturbed Areas

    a. Type of Area
    b. Type of Disturbance
    c. Amount of Seeding Required
    d. Care of Vegetation

D. Fish and Wildlife Management Plan

1. Progress to Date
2. Program Summary

E. Capital Costs/Expense

1. Summary
2. Detailed Breakdown

F. Other Studies/ Programs

1. Program Summary
2. Data
3. Interpretation/Analysis

APPENDIX II-3

ENVIRONMENTAL BASELINE DATA

MATRIX

The environmental baseline data matrix presented in Appendix II-3 is complete as of 31 March 1975. Any alterations or additions made by the Lessees and/or the Area Oil Shale Supervisor after that date can be changed or added with relative ease on this matrix.

The purpose of the environmental baseline data matrix is to provide a checklist to both the AOSS's staff specialists and the Lessees of the baseline data and environmental programs the Lessees have agreed to perform.

The main abbreviations used in the development of the matrix are:

EP ( ) - Exploratory Plan (page number)

OSS, date ( ) - Oil Shale Supervisor, letter of approval, date (paragraph numbers)

Sometimes the following abbreviations are used:

OSS, date, ammend - Oil Shale Supervisor, letter of approval, date, ammendment to a prior letter of approval

Supp ( ) - supplement to Lessee's Exploratory Plan (page number)

C-a/ECI dated and C-a/NUS dated - Tract C-a work statements by contractors ECI and NUS, date.

D. Biology

1. Terrestrial Flora

a. Program Summary

i. Plots

(1) Locations - Map
(2) Vegetation in Each Plot

ii. Transects - Map
iii. Vegetational Groups Under Study

(1) Types of Studies
(2) Vegetation Types and Dominant Species

iv. Problems Encountered

(1) Weather
(2) Equipment
(3) Other

v. Accomplishments To Date
vi. Future Plans

b. Data

i. Plant Community Study Elements

(1) By Plot, Quadrant, or Transect
(2) By Vegetation Type (Including Microflora)
(3) Research Methodology
(4) Data Collection

(a). Sampling/Observation Frequency
(b). Dates Collected
(c). Reporting Frequency

(5) Summary Chart For "Summary Report"

ii. Special Studies

(1) Productivity Studies

(a). Research Methodology
(b). Data Elements Collected
(c). Observations
(d). Report
(e). Summary Chart for "Summary Report"

(2) Development Studies

(a). Research Methodology
(b). Data Elements Collected
(c). Observations
(d). Report
(e). Summary Chart for "Summary Report"

(3) Decomposition Studies

(a). Research Methodology
(b). Data Elements Collected
(c). Observations
(d). Report
(e). Summary Chart for "Summary Report"

(4) Dendrochronology

(a). Research Methodology
(b). Data Elements Collected
(c). Observations
(d). Report
(e). Summary Chart for "Summary Report"

(5) Dendroclimatology

(a). Research Methodology
(b). Data Elements Collected
(c). Observations
(d). Report
(e). Summary Chart for "Summary Report"

(6) Other Studies (Including Endangered Species)

2. Terrestrial Fauna

a. Program Summary

i. Plots - Map
ii. Transects - Map
iii. Tracking
iv. Animal Groupings Under Study
v. Problems Encountered

(1) Weather
(2) Equipment
(3) Permits/Licenses
(4) Other

vi. Accomplishments To Date
vii. Future Plans

b. Data

i. Larger Mammals (Including Predator and Prey Species)

(2) Distribution
(3) Abundance
(4) Migration Patterns
(5) Seasonal Activities
(6) Habitat Requirements
(7) Sampling and Reporting Frequencies
(8) Synopsis for "Summary Report"

ii. Medium and Small-Sized Mammals

(1) By Species
(2) Distribution
(3) Abundance
(4) Migration Patterns
(5) Seasonal Activities
(6) Habitat Requirements
(7) Sampling and Reporting Frequencies
(8) Synopsis for "Summary Report"

iii. Birds

(1) By Species
(2) Distribution
(3) Abundance
(4) Migration Patterns
(5) Seasonal Activities
(6) Habitat Requirements
(7) Sampling and Reporting Frequencies
(8) Synopsis for "Summary Report"

iv. Endangered and Protected Species

(1) Species Identification
(2) Abundance
(3) Location
(4) Habitat
(5) Seasonal Activities
(6) Migration Patterns
(7) Observation Frequency
(8) Synopsis for "Summary Report"

v. Other Terrestrial Fauna (Including Insects and Microfauna)

(1) By Species
(2) Distribution
(3) Abundance
(4) Migration Patterns
(5) Seasonal Activities
(6) Habitat Requirements
(7) Sampling and Reporting Frequencies
(8) Synopsis for "Summary Report"

vi. Ecosystem Studies

(1) Type of Study
(2) Data Elements Collected
(3) Sampling and Reporting Frequency
(4) Report
(5) Synopsis for "Summary Report"

3. Aquatic System Studies

a. Program Summary

i. Sampling Stations and Collection Areas - Map
ii. Summary of Findings
iii. Problems Encountered

(1) Weather
(2) Equipment
(3) Other

iv. Accomplishments To Date
v. Future Plans

b. Data

i. Plant Studies

(1) Data Collection

(a) Sampling Frequency
(b) Dates Collected
(c) Reporting Frequency

(2) Data Elements

(a) Species
(b) Abundance
(c) Distribution
(d) Habitat Requirements

(3) Study Report
(4) Synopsis for "Summary Report"

ii. Animal Studies

(1) Data Collection

(a) Sampling Frequency
(b) Dates Collected
(c) Reporting Frequency

(2) Data Elements

(a) Species
(b) Abundance
(c) Distribution
(d) Habitat Requirements

(3) Study Report
(4) Synopsis for "Summary Report"

iii. Aquatic Microflora and Microfauna Studies

(1) Data Collection

(a) Sampling Frequency
(b) Dates Collected
(c) Reporting Frequency

(2) Data Elements

(a) Species
(b) Abundance
(c) Distribution
(d) Habitat Requirements

(3) Study Report
(4) Synopsis for "Summary Report"

E. Soil

1. Program Summary

a. Sampling

i. Location - Map
ii. Extent of Soil Survey

b. Nomenclature (National Soil Classification System)
c. Problems Encountered

i. Frozen Ground
ii. Weather
iii. Equipment
iv. Other

d. Accomplishments to Date
e. Future Plans

2. Data Collection

a. Sampling Frequency
b. Reporting Frequency

3. Data

a. Soil Survey

i. Physical and Engineering Characteristics
ii. Chemical Characteristics
iii. Soil Series and Types by Location
iv. Synopsis for "Summary Report"

b. Soil Productivity Studies

i. Soil Type
ii. Vegetative Growth Characteristics

(1) Capable of Plant Support
(2) Supports Which Plants Best
(3) Is Best for Which Plants

iii. Synopsis for "Summary Report"

c. Other Studies

F. Radiation

1. Program Summary

a. Monitoring Locations - Map
b. Required Monitoring Summary - Chart
c. Techniques
d. Problems Encountered

i. Equipment
ii. Standard Exceeded
iii. High Background Radiation Count
iv. Weather
v. Other

e. Accomplishments to Date
f. Future Plans

2. Data Collection

a. Sampling Frequency
b. Reporting Frequency

3. Data

a. Type of Radiation Monitored

i. Gross Alpha
ii. Gross Beta

b. Sample Type

i. Direct Radiation
ii. Airborne Particulates
iii. Surface Water
iv. Ground Water
v. Sediment
vi. Soil
vii. Aquatic Biota
viii. Vegetation

4. Instrument Calibration

a. Frequency
b. Techniques

G. Noise

1. Program Summary

a. Monitoring Locations - Map
b. Techniques
c. Problems Encountered

i. Weather
ii. Sample Site
iii. Exceptional Noises
iv. Others

d. Accomplishments to Date
e. Future Plans

2. Data Collection

a. Sampling Frequency
b. Reporting Frequency

3. Data

a. Noise Spectrum
b. Intensity
c. Repetitive Character
d. Seasonal Occurrences

4. Instrument Calibration

a. Frequency
b. Techniques

H. Archaeology

1. Program Summary

a. Sample Sites - Map
b. Site Selection Process
c. Problems Encountered

i. Finds
ii. Weather
iii. Other

d. Accomplishments to Date
e. Future Plans

2. Data

a. Finds

i. Historical
ii. Scientific

b. Location
c. Condition of Find
d. Synopsis for "Summary Report"

I. Aesthetics

1. Program Summary

a. Sampling Locations - Map

i. Location
ii. Dates Samples

b. Site Selection
c. Techniques
d. Problems Encountered
e. Accomplishments to Date
f. Future Plans

2. Data

a. Findings
b. Report

J. Seismicity

1. Program Summary

a. Monitoring Stations - Map
b. Problems Encountered

i. Equipment
ii. Other

c. Accomplishments to Date
d. Future Plans

2. Data Collection

a. Recording Frequency
b. Reporting Frequency

3. Data

a. Seismograph Records
b. High Resolution Seismic Lines
c. Faults
d. Others

4. Instrument Calibration

a. Frequency
b. Techniques

III. CORE AND WELL DRILLING

A. Program Summary

1. Progress to Date

a. Hole Locations - Map
b. Accomplishments

2. Problems Encountered
3. Future Plans

B. Well and Corehole Survey Plats

1. Locations - Maps
2. Well Functions

C. Well Summary Chart for Each Well

1. Status (Drilling, Complete, Etc.)
2. Drill Stem & Jetting Test
3. Drilling Water Production Data
4. Drilling Water Quality Analysis
5. Geophysical Log Data
6. Lithologic Log Data
7. Cored Intervals
8. Assays

a. Assay Method
b. Oil Shale
c. Alumina
d. Sodium

e. Water Chemistry (See Section II - C - 3 - c)*
f. Water Level Recovery
g. Calculated Transmissivity Values

i. By Well
ii. Graphical Transmissivity
iii. Date Tested
iv. Ground Level Elevation

h. Interpretation of Data

2. Water Production Tests

a. Wells Tested
b. Interval of Test
c. Water Temperature - Graph
d. Specific Conductivity - Graph
e. Production Rates
f. Drilling Injection Water Rate
g. Aquifer Transmissivity Calculation
h. Storage Coefficient Calculation
i. Interpretation of Data

3. Water Quality Tests (See Section II - C - 3 - c)*

E. Logs

1. Geophysical Log Data

a. Data Collection

i. Frequency
ii. Location
iii. Method(s) of Collection

(1) Standard Electric Resistivity Log
(2) Focused Electric Resistivity Log
(3) Sonic Log
(4) Gamma Ray Log
(5) Neutron Density Log
(6) Temperature Log
(7) Micro-Seismograph Log
(8) Caliper Log

iv. Summary Table

(1) Geophysical Log Type
(2) Well or Core Hole

b. Data

i. By Well
ii. Log - Charts - Graphs

* Data need not be repeated here

AIR QUALITY

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Sulfur Dioxide	EP (23,71)	EP (13)	EP (48)	continuous, 90% to 95% of the time	continuous, 90% to 95% of the time	continuous, 90% to 95% of the time
Hydrogen Sulfide	EP (23,71)	EP (13)	EP (48)	"	"	"
Suspended Particulates	EP (23,71)	EP (13)	EP (48)	"	"	"
Total Hydrocarbons	EP (23,71)	EP (13)	EP (48)	"	"	"
Oxides of Nitrogen	EP (23,71)	EP (13)	EP (48)	"	"	"
Methane	EP (23,71)	EP (13)	EP (48)	"	"	"
Carbon Monoxide	EP (23,71)	EP (13)	EP (48)	"	"	"

AIR QUALITY (CONTINUED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Ozone	EP (23,71)	EP (13)	EP (48)	"	"	"
Particulate - Particle Sizing	EP (71)	EP (17)	EP (53) OSS 8/27/74 (B.1-2)	quarterly	quarterly	quarterly
Composite Particulate Analysis (A)	OSS 7/22/74 (1.2)	OSS 7/26/74 (1,2)	OSS 8/27/74 (B.1-2)	quarterly	quarterly	quarterly
Carcinogens	-	-	EP (48)	-	-	regular basis
Reactive Hydrocarbons	-	-	EP (48)	-	-	regular basis
Soiling	-	-	EP (48)	-	-	regular basis
Records (Site Log, Operator Log, Calibration Records)	OSS 7/22/74 (3)	OSS 7/26/74 (3)	OSS 8/27/74 (B.3)			

AIR QUALITY (CONCLUDED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Reports for Averaging Periods Set Forth by Federal and State Regulations	-	EP (15)	-	-	annual	-
Reports on Each Station Showing Location, Regulations, Data Summary	-	EP (15)	-	-	annual	-
Polynuclear aromatic compounds	-	-	EP (53)	-	-	
Gamma Radiation Study	-	-	EP (74,75)	-	-	

COMPOSITE PARTICULATE ANALYSIS A

Composite Sample Analysis from One High Volume Particulate Sample (Required by OSS):

Suspended particulates: concentration, particle size range

Gross radioactivity

Qualitative screening trace elements including:

Aluminium	Lead	Selenium
Antimony	Lithium	Silver
Arsenic	Magnesium	Strontium
Barium	Manganese	Sulfur
Beryllium	Mercury	Tin
Bismuth	Molybdenum	Titanium
Cadmium	Nickel	Thallium
Calcium	Osmium	Thorium
Cerium	Palladium	Uranium
Chromium	Phosphorus	Vanadium
Cobalt	Platinum	Ytterbium
Copper	Radium	Yttrium
Fluorine	Rhenium	Zinc
Gallium	Rhodium	Zinconium
Germanium	Rubidium	
Iron	Ruthenium	
Lanthanum	Scandium	

Quantitative enelysis required if high levels of toxic elements are detected, or if beta radiation exceeds 1 pc/M^3 or large jumps in gross radioactivity occur.

METEOROLOGY

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Wind Speed	EP (68)	EP (13-15)	EP (68)	Continuous, 90-95% of the time	Continuous, 90-95% of the time	Continuous 90-95% of the time
Wind Direction	EP (68)	EP (13-15)	EP (68)	"	"	"
Humidity	EP (68)	EP (13-15)	EP (68)	"	"	"
Temperature	EP (68)	EP (13-15)	EP (68)	"	"	"
Visibility Study	EP (20,69) OSS 7/22/74 (5)	OSS 7/26/74	EP (48) OSS 8/27/74 (B.5)	regular basis	regular basis	regular basis
Precipitation	EP (68)	EP (13)	EP (68)	continuous	continuous	continuous
Snow Depth	EP (68)	-	EP (67)	2 times per month	-	continuous

METEOROLOGY (CON'T)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Solar Radiation	EP (22,68)	OSS 7/26/74 (10)	EP (68)			
Seasonal Studies (Tracer Diffusion Study)	EP (22)	-	-	intermittent	-	-
Air Flow (Turbulence, Distribution of Wind Speeds)	-	OSS 1/2 /75 (3,4) EP (15)	EP (68)	-		continuous
Upper Atmosphere, Wind and Temperature	-	OSS 1/24/75 (6)q	OSS 8/27/74 (B.7)	-	15 days per quarter	15 days per quarter
Upper Atmosphere (Flow Features, Structure, Dispersion, Plume, Turbulence)	-	-	EP (71)	-	-	turbulence 3 times/ day; 15 days/quarter
Cloud Cover	-	-	EP (67)		-	continuous
Air Flow (General Circulation, Local Circulation)	EP (20)	-	-	2 times/day, 15 times/quarter	-	-

METEOROLOGY (CONCLUDED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Temperature Difference	EP (68)	-	-		-	-
Effects of Terrain on Wind Field	-	EP (16)	EP (72)	-		
Ground Level Radiation	-	EP (16)	EP (74,75)	-		
Moisture Content and Vertical Moisture Profile of Air	-	EP (16)	-	-		-
Diffusion Modeling Program	-	EP (17)	EP(62,63)	-		
Pibal Tracking	-	-	EP (71)	-	-	
Acoustic Echo Sounder	-	OSS 1/24/75 (8)	EP (71)	-		frequent observations

BIOLOGY

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Flora Distribution	EP (13,14) OSS 10/25/74 (1,3,7,8)	EP(20) 0558/19/74 (4,6,8)	EP(77,100,111)		quarterly	twice a year
Density of Flora	"	"	EP (77,100,111)		"	"
Condition of Flora	"	"	EP (77,100,111)	spring, summer autumn	"	"
Species of Fauna	EP (14-16) OSS 10/25/74 (7,8)	EP (21,22) OSS 8/19/74 (4,5,6,8)	EP (100,111)		critical seasons, bi-monthly	
Distribution of Fauna	"	"	EP (100,111)		"	"
Abundance of Fauna	"	"	EP (100,111)	critical seasons, bi-monthly	"	"
Ecological Relationships (Including migratory patterns)	EP (13-18) OSS 10/25/74 (9,15)	EP (21) OSS 8/19/74	EP (100)			

BIOLOGY (CON'T.)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Aquatic Microinvertebrates	-	-	EP (116)	-	-	seasonally
Aquatic Macroinvertebrates	EP (17)	EP (23)	OSS 10/3/74 (1)	opportunistic samples	seasonal ccomparisons	
Vegetative Dominance	EP (13,14)	EP (20)	-			-
Reproductive State	-	EP (21,22)	-	-	bi-monthly	-
Microorganisms/Bacteria	-	EP (24)	EP (106)	-		bi-monthly
Aquatic Ecology	EP (16-18)	EP (23,24) OSS 8/19/74 (1,3,4,5)	EP (110) OSS 10/3/74 (2)			
Terrestrial Invertebrates	EP (14)	EP (22)	EP (100)	seasonal	quarterly	periodic or opportunistic samples

BIOLOGY (CON'T.)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Plant Animal Relations	"	"	EP (100)			
Inventory of Water Features	OSS 10/25/74 (14)	EP (21)	-			
Trace Element Levels (Flora)	-	EP (20)	-	-		-
Epiphyte Infestations	EP (14)	-	-	each season		
Rare, Endangered Species	EP (7-10)	EP (21,23) OSS 8/19/74	EP (118) OSS 10/3/74	seasonal		
Weight Measurements (Fauna)	-	EP (21,22)	-	-	bi-monthly ,	-
Algae Study	-	EP (23)	-	-	"	-

BIOLOGY (CON'T.)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Aquatic Habitat Evaluation	C-a/NUS Supp. 10-3-74	EP (23)	EP (110)			seasonal
Terrestrial Vertebrates	EP (15,16)	EP (21,22) OSS 8/19/74 (1,4,5,6)	EP 100	bi-monthly, seasonally	quarterly	
Desert Biome Study	-	-	EP (77-96) OSS 10/3/74 (2,3,5,7)	-	-	
Fish Studies	EP (17,18)	EP (23) OSS 8/19/74 (1)	EP (96,118) OSS 10/13/74	quarterly	bi-monthly	bi-monthly
Nocturnal Breeding Survey (Amphibians & Reptiles)	EP (15)	-	-		-	-
Feeding, Movements, Migratory Patterns of Important Indigent Species (Birds)	EP (15)	EP (21)	-			-
Survey Nesting Sites & Breeding Areas of Captors	EP (15)	-	EP (92-95)	appropriate time of year	-	throughout year

BIOLOGY (CON'T)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Migratory Routes Mapped (Mammals)	EP (16)	EP (21)	-	quarterly.		-
Seasonal Production, End of Season Production (Flora)	EP (13,14)	EP (20)	EP (81) OSS 10/3/74 (7)	spring, summer autumn		spring, summer autumn
Plankton Samples	EP (16)	-	EP (114)		-	bi-monthly
Periphyton	EP (17)	-	EP(113)	at appropriate sites	-	"
Macrophytes	EP (17)	-	EP (113)	opportunistic sampling	-	"
Literature Review (Flora/ Fauna)	EP (5) C-a/ECI Supp. 10-1-74	EP (19)	-			-
Stomach Samples	C-a/ECI Supp. 10-1-74	-	-		-	-

BIOLOGY (CONCLUDED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Bat Inventory	C-a/ECI Supp. 10-1-74	-	-		-	-
Sex Ratio & Age Classes for deer	C-a/ECI Supp. 10-1-74	-	-		-	-
Benthic Species Study	C-a/NUS Supp. 10-3-74	-	-		-	-

WATER QUALITY AND HYDROLOGY - SURFACE WATER

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Stream Flow Records	EP (40)	EP (6)	EP (19) OSS 8/27/74 (A.9)	continuous where possible	continuous where possible	content continuous where possible
Water Temperatures	EP (40)	EP (6)	EP (19) OSS 8/27/74 (A.9)	"	"	"
Precipitation Records	EP (40,68)	EP (13) OSS 8/8/74 (12)	EP (25)	"	"	"
Sediment Records	EP (40)	EP (6)	EP (18) OSS 8/27/74 (A.9)	"	"	"
Rainfall Intensity	EP (41)	-	-		-	-
Specific Conductance, pH, Dissolved Oxygen	EP (41,42) OSS 8/15/74 (2)	EP (6) OSS 8/8/74 (6)	EP (19,22) OSS 8/27/74 (A.2)	semi-monthly	semi-monthly	semi-monthly
Sediment (Concentration, Particle Size)	EP (41)	-	OSS 8/27/74 (A.9)	at least once a week	-	four times per year

PARAMETER	Class		Transition Frequency		
	C-a	C-b & C-c	T-a	C-b	T-a & C-b
Stream Flow Records	EP (40)	EP (8)	Continuous where practical	Continuous where practical	Control .centimeter where practical
Water Temperature	EP (40)	EP (8)	"	"	"
Precipitation Records	EP (40,50)	EP (12)	"	EP (12)	"
Sediment Records	EP (40)	EP (8)	"	"	"
Material Immunity	EP (41)	"	"	"	"
Specific Conductance, pH, Dissolved Oxygen	EP (41,42)	EP (8)	Semi-monthly	Semi-monthly	Semi-monthly
Sediment Concentration, Particle Size	EP (43)	"	At least once a week	"	Four times per year

WATER QUALITY AND HYDROLOGY - SURFACE WATER (CONTINUED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	J-a & U-b	C-a	C-b	U-a & U-b
Chemical & Biological Analysis (A)	EP (42) OSS 8/15/74 (2)	-	-	semi-monthly and some quarterly	-	-
Chemical Analysis (B)	-	EP (9) 8/8/74 (2,3,6)	-	-	semi-monthly & some quarterly	-
Bottom Sediment (Mineralogy, Size, Distribution)	-	-	EP (18) OSS 8/27/74 (A.9)	-	-	quarterly
Chemical Analysis (C)	-	-	EP (19-23) OSS 8/27/74 (A.2, A.6)	-	-	semi-monthly and some quarterly
Gauging Stations, Number and Location	EP (40,41)	OSS 8/8/74 (1)	EP (16) OSS 8/27/74 (A.1, A.2)	upstream and downstream	upstream and downstream	upstream and downstream
Log of Work Performed	OSS 8/15/74 (4)	OSS 8/8/74 (4)	OSS 8/27/74 (A.3)	at each site	at each site	at each site
On Site Lab	-	EP (8)	-	-		-

WATER QUALITY AND HYDROLOGY - SURFACE WATER (CONCLUDED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Coordinate Biotic Sampling with Water Sampling	OSS 8/15/74 (11)	OSS 8/8/74 (13)	OSS 8/27/74 (A.9)			
Analysis (D)	-	OSS 8/8/74 (8,10)	OSS 8/27/74 (A.5-6)	-	quarterly	quarterly
Evaporation	-	-	OSS 8/27/74 (A.8)	-	-	

CHEMICAL & BIOLOGICAL ANALYSIS A

SURFACE WATER MONITORING

1. Semi-Monthly Chemical Analyses (Qualitative)*

Barium	Selenium	Dissolved Solid
Boron	Silica	Kjeldahl nitrogen
Calcium	Sodium	Nitrate
Hexavalent chrome	Sulfate	Nitrite
Copper	Zinc	Odor
Fluoride	Ammonia	Oil and grease
Iron	Bicarbonate	Turbidity
Lithium	Carbonate	Dissolved oxygen
Magnesium	Chloride	pH
Potassium	Color	

2. Semi-Monthly Chemical Analyses**

Arsenic	Manganese	Artho phosphate
Cadmium	Mercury	Cyanide
Lead	Total Phosphate	Sulfide

3. Quarterly Organic Compound Analyses (Quantitative)

Analyze samples quarterly for total organic carbon (TOC).
If TOC < 10 mg/l, no further analysis is necessary.
If TOC ≥ 10 mg/l, water samples must be analyzed for concentrations of:

Dissolved organic carbon (DOC)
Suspended organic carbon (SOC)
Phenols
Sulfur (acid extraction)***
Nitrogen (base extraction)***

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* Quantitative analyses required if high levels of toxic elements are detected.

** Qualitative analyses required, but subject to review by OSS: requirements may be revised by OSS if tests show probability of occurence is negligible.

*** Acid and base extracts to be preserved for further analysis of organic constituent compounds if unusually large increases of organics occur in the water samples.

CHEMICAL & BIOLOGICAL ANALYSIS A (CONCLUDED)

SURFACE WATER MONITORING

4. Miscellaneous Analyses (Quarterly)

Chemical oxygen demand (COD)
Fecal coliforms
Pesticides
Polycyclic aromatics
Radioactivity
Gross alph 7 beta
If gross alpha > 4 picocuries/liter: analyze for radium 226
If gross beta > 100 picocuries/liter: analyze for thorium 230 and natural uranium

5. Complete Element Scan on samples from each gauging station quarterly. (Subject to review by OSS pending review of data findings)

6. Biotic Surveys to determine numbers of individuals and species of periphyton and aquatic macroinvertebrates.

CHEMICAL ANALYSIS B

SURFACE WATER QUALITY ANALYTICAL PROGRAM

All Surface Waters

	Continuous	Semi-Monthly	Quarterly	Semi-Annually	Reference
Temperature	x				4
Specific Conductivity	x				4
Dissolved Solids					1,2
Suspended Solids		x			1
Dissolved Oxygen	x				4
pH	x				4
Turbidity*	x	x			1,2
Color		x			1,2
Odor		x			1,2
Silicon		x			2
Silica		x			1
Calcium		x			1,2
Magnesium		x			1,2
Sodium		x			1,2
Potassium		x			1,2
Ammonia		x			1,2
Cyanide		x			1,3
Sulfur		x			2
Sulfate		x			1
Sulfide		x			1,3
Nitrate		x			1,2
Nitrite		x			1,2
Kjeldahl Nitrogen		x			2
Phosphate		x			1
Chloride		x			1,2
Carbonate		x			1,2
Bicarbonate		x			1,2
Florine		x			2
Flouride		x			1
Lithium		x			1,2
Barium		x			1,2
Chromium		x			1,2
Arsenic		x			1,3
Selenium		x			1,2
Cadmium		x			1,3
Copper		x			1,2
Boron		x			1,2
Iron		x			1,2
Lead		x			1,3
Manganese		x			1,3

* Continuous measurements on Piceance Creek upstream and downstream of Tract C-b and semi-monthly measurements (as possible) at the other gauging stations. OSS 8/8/74 (7)

CHEMICAL ANALYSIS B (CONCLUDED)

SURFACE WATER QUALITY ANALYTICAL PROGRAM

All Surface Waters

	Continuous	Semi-Monthly	Quarterly	Semi-Annually	Reference
Silver		x			1
Zinc		x			1,2
Complete element scan for all trace elements			x	x	1
Gross Alpha*			x		1
Gross Beta*			x	x	1
COD		x	x	x	1
BOD					1
Oil & Grease		x			1,2
Carbon Chloroform Extract		x			1
Coliform Total & Fecal					1
Alkyl Benzene Sulfonate		x			1
Phenols		x			1
[illegible]s				x	1
[illegible]yclic Aromatics					1
Pesticides					1
Asbestos				x	1
Mercury		x			1,3
Beryllium		x			1
Molybdenum		x			1
Phosphorus					3
TOC**			x		

1. Qualitative Analysis required by EP, page 9.
2. Qualitative Analysis required by OSS 8/8/74 (2); Quantitative Analysis required if high levels of toxic elements are detected.
3. Qualitative Analysis required by OSS 8/8/74 (3); semi-monthly basis my be revised by the Area Oil Shale Supervisor.
4. Continuous at 4 major sites; whenever possible at the 9 temporal sites, OSS 8/8/74 (6).
5. Quantitative Analysis required by OSS 8/8/74 (8); quarterly basis.

* Depending on count, thorium 230, radium 226, strontium 90 and natural uranium may be required. Quarterly at 4 major stations; semi-annually at 9 temporal stations.

** If TOC < 10 mg/l, no further analysis required.
If TOC ≥ 10 mg/l, sample must be analyzed for dissolved organic carbon (DOC), suspended organic carbon (SOC), phenols, sulfur by acid extraction, nitrogen by base extraction, and extracts preserved for future analysis.

CHEMICAL ANALYSIS C

SURFACE HYDROLOGY ANALYSIS

Constituent	Frequency	Source	Constituent	Frequency	Source
Specific Conductance	C	EP(22)	Carbonate	SM	EP
Temperature	C	"	Bicarbonate	SM	"
Turbidity	C	"	Fluoride	SM	"
Dissolved Solids	D*	"	Boron	SM*	"
Total Dissolved Solids	SM	"	Aluminum	SM*	"
Suspended Solids	SM	"	COD	SM	"
Dissolved Oxygen	SM	"	BOD	SM*	"
pH	SM	"	Phenols	SM	"
Total Alkalinity	SM	OSS**	TOC	SM*	"
Silica	SM	EP	TC	SM	"
Calcium	SM	"	Sulfide	SM*	OSS**
Magnesium	SM	"	Lithium	M	EP
Sodium	SM	"	Barium	M	"
Potassium	SM	"	Chromium	M	"
Ammonia	SM	"	Arsenic	M	"
Nitrate	SM	"	Selenium	M	"
Nitrite	SM	OSS**	Cadmium	M	"
Total Kjeldahl Nitrogen	SM	EP	Copper	M	"
Sulfate	SM	EP	Iron	M	"
Total Phosphorus	SM	EP	Nickel	M	"
Ortho Phosphate	SM	OSS**	Vanadium	M	"
Total Phosphate	SM	OSS**	Lead	M	"
Chloride	SM	EP	Manganese	M	"
Bromide	SM	OSS**	Cyanide	M	OSS**
Silver	M*	EP	Tin	M	EP
Zinc	M	EP	Strontium	M*	EP
Oil and Grease	SM*	OSS**	Titanium	M*	EP
Carbon Chloroform Extract	M	EP	Thorium	M	EP
			Yttrium	M	EP

C = Continuous
D = Daily
SM = Semimonthly
M = Monthly
Q = Quarterly
SA = Semi-annually

* = More stringent of two schedule requirements
** = Approval dated 27 August 1974 (2)

ANALYSIS D

ORGANIC COMPOUNDS

TOC < 10 mg/l, no further analysis required.
TOC ≥ 10 mg/l, sample must be analyzed for concentrations of:

Dissolved organic carbon (DOC)
Suspended organic carbon (SOC)
Phenols
Sulfur (acid extraction)
Nitrogen (base extraction)

Extracts to be preserved for future analysis of organic compounds if unusually large increases in organics occur in water.

Radiation for C-b

If gross alpha > 4 pcu/l, analyze for Ra^{226}.
If gross beta > 100 pcu/l, analyze for Th^{230} and natural uranium.

Radiation for Utah Tracts

If gross alpha > 4 pcu/l, analyze for uranium, thorium and radium 226.
If gross beta > 100 pcu/l (exclusive of K_{40}), analyze for uranium, thorium, radium 226, lead 210 and radium 228.

WATER QUALITY & HYDROLOGY

- GROUND WATER -

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Discharge Measurements	OSS 8/27/74 (ammend #1)	OSS 9/20/74 (6)	EP (34) OSS 8/27/74(3,6)	as pumped at least every 30'	as pumped at least every 30'	as pumped at least every 30'
Water Level Fluctuations	EP (46)	EP (10)	EP (35) OSS 8/27/74 (8)			
Temperatures/Specific Conductivity	EP (47) OSS 8/27/74 (ammend #1)	OSS 5/31/74 (6)	EP (19,23,42) OSS 8/27/74 (3)	"	"	"
Pump Test Records	EP(46)	EP 4/10/74 (6)	EP (36)	as required	as required	as required
Observation Wells Locations	EP (44,45)	EP (11) EP 4/10/74 (2,3)	EP (30,38)	"	2 above, 2 below mining site	"
Analysis (A)	EP (47,48) OSS 8/27/74 (ammend #1)	-	-	at the start of tests and every six months	-	-
Analysis (B)	-	EP (10,11) OSS 5/31/74 (6,7)	-	-	at start of tests and every six months	-

PARAMETER	TRACE		PRECIPITATION		
	C=0	C=5	C=0	C=5	T=0 & C=0
Chloride Concentration	0DS 8(2)(7)a (Amend 81)	0DS 8(2)(7)a(i) (b)	0DS 8(2)(7)a(ii) (b)	As posted at least every 30'	As posted at least every 30'
Water Level Fluctuations	0E (3d)	0E (10)	0E (10) 0DS 8(2)(7)a (d)		
Temperature/Specific Conductivity	0DS 8(2)(7)a (Amend 81)	0DS 8(2)(7)a (d)	0DS 8(2)(7)a (d)		
Temp Test Results	0E(4b)	0E 8(2)(7)a (b)	0E (3d)	As required	As required
Observation Hole Locations	0E (4a,4b)	0E (11) 0E 8(2)(7)a (i,j)	0E (3b,3d)	-	1 above, 1 below mixing elv
Analysis (A)	0E (4f,4h) 0DS 8(2)(7)a (Amend 81)	-	-	At the start of tests and every six months	-
Analysis (B)	-	0E (3d,11) 0DS 8(2)(7)a (b,j)	-	-	At start of tests and every six months

WATER QUALITY & HYDROLOGY
- GROUND WATER - (CON'T)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Core and Cuttings (Analysis E)	EP (37)	OSS 5/31/74 (8)	EP (Supp 5)			
Pressure or Fluid Levels Above or Below Packer	EP (45)	OSS 3/31/74 (6)	EP (35)	prior to, during, and after pump tests		
Resistivity Logs	EP (47) OSS 8/27/74 (ammend #1)	OSS 5/31/74 (8)	-	each hole except shallow allurcium aquifer holes	as needed on drill holes	
Transmissivity and Storage Coefficient	EP (47)	EP (10) OSS 5/31/74 (6)	EP (36)			
Rock Mechanics Tests	EP (44,48) OSS 8/27/74 (ammend #1)	OSS 5/31/74 (18)	EP (Supp5)			
Direction & Movement of Alluvial Water	EP (43,48)	EP (10)	-			
Aquifer Computer Simulation Model	EP (43)	EP (11)	-			

WATER QUALITY & HYDROLOGY
- GROUND WATER - (CON'T)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Isolate Upper & Lower Aquifer For Tests	EP (42,43)	EP (10)	EP (35,36)	as required	as required	as required
Comprehensive multiwell hydrologic test i.e., "leaky aquifer test:	EP (43)	EP (10) EP 4/10/74 OSS 5/31/74 (6)	EP (36)	"	"	"
Well Logs	-	-	EP (26,35,36)	-	-	"
Geophysical Log	EP (47)	EP 4/10/74 (6)	EP (26)			"
Analysis (C)	-	-	EP (19-23,42) OSS 8/27/74 (3)	-	-	monthly; during tests; at least every six months
Analysis (D)	-	-	EP (19-23,42)	-	-	monthly
Inventory of Wells Within 20 Miles	-	-	EP (26)	-	-	as stated

PARAMETER	TRUCK			TRAILER/DOLLY/CONVERTER		
	C-a	C-b	C-a & C-b	C-a	C-b	C-a & C-b
Safety Cages & Lower Guards for Ladders	(2) (10,19)	(2) (19)	(2) (18,20)	As required	As required	As required
Compressor multiwell hydrologic test kit - Tanks and/or tanker unit	(2) (22)	(2) (19) (2) Airlifts (4)	(2) (20)	-	-	-
Bail Rope	-	-	(2) (18,22,24)	-	-	-
Communications	(2) (24)	(2) (19)a (e)	(2) (20)	-	-	-
Analysis (c)	-	-	(2) (17-21,23) (2) Airlifts (3)	-	-	Quarterly during transit at least every six months
Analysis (d)	-	-	(2) (18-21,23)	-	-	Monthly
Inventory of Drilling Fluids	-	-	(2) (23)	-	-	As stated

WATER QUALITY & HYDROLOGY
- GROUND WATER - (CONCLUDED)

The Following Parameters are Required for Colorado Drinking Water Standards	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Alkyl Benzene Sulfonate						
Strontium 90						
Radium 226	OSS 8/27/74 (1) (ammend #1)	5/31/74 (7) (1)	OSS 8/27/74 (3)(1)	semi-annual sample	semi-annual sample	semi-annual sample
Silver	-	EP (10,11)	EP (19-23,42) OSS 8/27/74 (3)	"	"	"
Phenols	OSS 8/27/74 (2) (ammend #1)	OSS 5/31/74 (7)(2)	EP (19-23,42)(2)	"	"	"
Cyanide						
Carbon Chloroform Extract						

(1) Required if gross alpha 4pcu/1
(2) Required if TOC 10mg/1

ANALYSIS A

SUBSURFACE WATER MONITORING

ITEM	FREQUENCY OF APPLICABLE SAMPLES
1. Quantity, specific conductivity and temperature of discharged water.	Measure and record at intervals not to exceed 30 feet during drilling and at time intervals not to exceed 6 hours during pump tests. (Changes in conductivity during pump tests may require more frequent collection of data.)
2. Quality analysis of samples taken during drilling.	Obtain at least two water quality samples from above the Mahogany and two water quality samples from below the Mahogany in each deep hole during drilling.
3. Chemical analysis for: Aluminum, Ammonia, Arsenic, Barium, Beryllium, Bicarbonate, Bismuth, Boron, Cadmium, Calcium, Carbonate, Cerium, Chlorine, Hexavalent chrome, Cobalt, Copper, Fluoride, Gallium, Hydroxide, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Nitrate, Total phosphate, Potassium, Selenium, Silica, Sodium, Strontium, Sulfate, Total hardness, Titanium, Vanadium, Yttrium, Zinc, Zirconium	Water quality samples taken during: Drilling Pump tests Routine sampling of observations and test holes
4. Analysis for: Total organic carbon (TOC)	If TOC < 10 mg/l, further analysis is not necessary. If TOC ≥ 10 mg/l water samples will be analyzed for concentrations of dissolved organic carbon (DOC), suspended organic carbon (SOC), phenols, sulfur and nitrogen.

ANALYSIS A (CONCLUDED)

SUBSURFACE WATER MONITORING

ITEM	FREQUENCY OF APPLICABLE SAMPLES
4. Analysis for: Total organic carbon (TOC) (concluded)	(Concentration of S and N to be determined by acid extraction and base extraction, respectively. The extracts will be preserved for future analysis of organic constituent compounds if unusually large increase of organics occur in the water quality samples.)
5. Radioactivity: Gross alpha and gross beta	If gross alpha > 4 picocuries per liter; analysis for radium 226 will be done. If gross beta > 100 picocuries per liter; analysis for thorium 230 and natural uranium is required.

ANALYSIS B

Aluminum
Ammonia
Arsenic
Barium
Beryllium
Bicarbonate
Bismuth
Boron
Cadmium
Calcium
Carbonate
Cerium
Chloride
Chrome, Hexavalent
Cobalt
Conductivity, Specific
Copper
Fluoride
Gallium
Hardness, Total
Hydroxide
Iron
Lead
Lithium
Magnesium
Manganese
Mercury
Molybdenum
Nickel
Nitrate
pH
Phosphate, Total
Potassium
Selenium
Silica
Silver
Sodium
Solids, Dissolved
Strontium
Sulfate
Titanium
Vanadium
Yttrium
Zinc
Zirconium
Radioactivity
  Gross Alpha (pcl)
    Radium 226*
  Gross Beta (pcl)
    Thorium 230*
    Uranium**
Total Organic Carbon (TOC)
  If TOC 10/mgl then measure
    Dissolved Organic Carbon
    Suspended Organic Carbon
    Phenols
    Sulfate, Acid Extraction
    Nitrogen, Base Extraction

---

* Required if gross alpha is greater than 4 picocuries per litre(pcl).
** Required if gross beta is greater than 100 picocuries per litre(pcl).

ANALYSIS C

GROUND WATER ANALYSES FROM W

Semi-Annually

Specific conductance	Os
Temperature	Cd
Total dissolved solids	Cu
pH	Se
Si	Total Fe
Ca	Ni
Mg	V
Na	Pb
K	Mn
NH_3	Ag
NO_3	Zn
Total Kjedahl nitrogen	Hg
SO_4	Be
Total P	Mo
Ortho P	Bi
Cl	Ce
CO_3	Co
HCO_3	Ga
F_1	Sa
B	Sr
Al	Th
TOC***	Y
TC	Ge
TIC	2r
S	Color
Li	Oil and grease
Ba	Gross alpha* and gross beta**
CrVI	

*Readings of gross alpha activities exceeding four picocuries/liter necesitate specific analyses to be made for uranium, thorium and radium 226.

**Reading of gross beta activity (exclusion of K_4O) exceeds 100 picocuries/liter necessitates analyses for uranium thorium radium 226, lead 210 and radium 228.

***Total organic carbon (TOC) is shown to be less than 10 mg/liter, then further chemical analysis is not necessary. If TOC is equal or greater than 10 mg/liter, water samples will be analyzed for concentrations of dissolved organic carbon (DPC),suspended organic carbon (SPC), phenols, sulfur and nitrogen. Concentrations of sulfur and nitrogen will be determined via acid extraction and base extraction respectively. The acid and basic extracts will be preserved for future analysis of organic constituent compounds which will be required if unusually large increases of organics occur in water samples.

ANALYSIS D

GROUND WATER

ORGANIC CONSTITUENTS

acids,
alcolols,
aldehydes,
ketones,
polyhydroxy
compounds,
phenols,
bases,
aminos,
sugar,
polycyclic
aromatics,
starch groups
organic
compounds

INORGANIC CONSTITUENTS

standard cations
and anions,
alkalinity,
solids,
turbidity,
nitrites,
organic nitrogen,
nitrogen,
odor

MEASUREMENT INDICATORS

biochemical
oxygen demand (BOD)
dissolved
oxygen (DO)
suspended organic
carbon (SOC)
temperature,
conductivity,
suspended solids

TRACE ELEMENTS

arsenic,
tin

ANALYSIS E

CORE & CUTTING, ANALYSIS

Arsenic
Antimony
Boron
Cadmium
Fluoride
Mercury
Selenium

TABLE II

AIR QUALITY

Particulate - Trace Element Analysis — Times/Year = Quarterly

Aluminun
Antimony
Arsenic
Barium
Beryllium
Bismuth
Cadmium
Calcium
Cerium
Chromium
Colbalt
Copper
Fluorine
Gallium
Germanium
Iron
Lanthanum
Lead
Lithium
Magnesium
Manganese
Mercury
Molybdenum
Nickel
Osmium
Palladium
Phosphorus
Platinum
Radium
Rhenium
Rhodium
Rubidium
Ruthenium
Scandium
Selenium
Silver
Strontium
Sulfur
Tin
Titanium
Thallium
Thorium
Uranium
Vanadium
Ytterbium
Yttrium
Zinc
Zirconium

SOIL

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Prepare Mpas, Tables, Reports on Soil Types	EP (6,11) OSS 10/25/74 (1,2,9,15)	OSS 10/2/74 (1)	EP (135) OSS 11/14/74 (5)	quarterly and as final report		
Sample Various Layers of Soil (50 feet)	EP (11) OSS 10/25/74 (9)	EP (25) OSS 10/2/74 (1)	EP (135) OSS 11/14/74 (5)	-	quarterly report	
Strike and Dip of the Material	EP (28)	EP (26)	EP (112-125)	"	"	
Slopes	EP (28)	EP (26)	EP (123-125)			
Solar Exposure	EP (22.68)	OSS 7/26/74 (10)	EP (68)			
Vegetative Cover/Mapping	EP (12) OSS 10/25/74 (9)	EP (26) OSS 10/2/74 (2)	EP (136) OSS 11/14/74	quarterly and a final report	quarterly	
Erodability	-	-	EP (139)	-	-	

SOIL (CONTINUED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Chemical Analysis C	-	-	EP (137,138) OSS 11/14/74 (4)	-	-	
Water Capacity	C-a/ECI Supp. 10-1-74	-	OSS 11/14/74 (4)		-	
Dust Control	-	-	EP (142)	-	-	additional report
Soil Percolation Evaluation	-	-	EP (136)	-	-	
Analysis D	-	-	EP (139,140)	-	-	
Literature Search	EP (5)	-	-		-	-
Productivity	OSS 10/25/74 (1)	EP (26)	EP (135,138)			

SOIL (CONTINUED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Background Radioactivity	OSS 10/25/74 (1)	OSS 10/2/74 (5)	EP (74,75,138)			
Chamical Analysis A	EP (11,12) OSS 10/25/74 (11,12,15)	-	-		-	-
Permeability Tests	OSS 10/25/74 (13)	OSS 10/2/74 (7)	EP (139) OSS 11/14/74 (2)			
Soil Classification (Atteburg limits, moisture content, one-dim. consolidation)	OSS 10/25/74 (13)	OSS 10/2/74 (7)	EP (139) OSS 11/14/74 (2)			
Physical Properties of Rock Outcrops and bedrock)	OSS 10/25/74 (14)	OSS 10/2/74 (7)	EP (136) OSS 11/14/74 (3)			
Chemical Analysis B	-	EP (25) OSS 10/2/74 (5)	-	-		-
Subsidence	-	-	EP (129)	-	-	semi-annual

SOIL (CONCLUDED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Soil Microbiology	-	EP (26)	-	-		-
Experienced Personnel Used	-	OSS 10/2/74 (4)	-	-		-
Soil-Vegetation Correlation	-	-	EP (139)		-	
Analysis E	C-a/ECI Supp. 10-1-74	-	-		-	-

CHEMICAL ANALYSIS C (CONCLUDED)

Constituent	Frequency	Source
Total Coliform	M	"
Fecal Coliform	M	"
Fecal Strep	M	"
Mercury	M	EP
Beryllium	M*	EP
Molybdenum	M	EP
ABS	SM*	OSS**
Chlorophyll A	M	EP
Radioactivity		
Gross Alpha	M	EP
Gross Beta	M	EP
Bismuth	M	"
Cesium	M	"
Cobalt	M	"
Gallium		
Complete spectrographic semiquantitative scan of trace elements, including:		
Arsenic	SA	EP
Barium	"	EP
Beryllium	"	EP
Bismuth	"	OSS**
Boron	"	EP
Cadmium	"	EP
Copper	"	EP
Chronium	"	EP
Gallium	"	OSS**
Germanium	"	OSS**
Lead	"	EP
Lithium	"	EP
Manganese	"	EP
Mercury	"	EP
Molybdenum	"	EP
Selenium	"	EP
Silver	"	EP
Thorium	"	OSS**
Tin	"	OSS**
Yttrium	"	OSS**
Zinc	"	EP

Constituent	Frequency	Source
Zirconium	M	EP
Dissolved Gas	M	EP
Antimony	Q	OSS**
Radium 226	Q	EP
Uranium (Dissolved)	Q	EP
Color	Q	EP
Odor	Q	EP
Asbestos (And Similar Fibers)	Q	OSS**
Aquatic Micro-organism	Q	EP
Amines	Q	EP
Aldehydes	Q	EP
Ketones	Q	EP
Polycyclic aromatics (if neutral oil fraction of organic extraction warrants ABS, MBAS)	SM*	OSS**
Pesticides (all kinds)	SM*	OSS**

C = Continuous
D = Daily
SM = Semimonthly
M = Monthly
Q = Quarterly
SA = Semi-annually

* = More stringent of two schedule requirements
** = Approval dated 27 August 1974 (2)

CHEMICAL ANALYSIS A

SOILS

Chemical Analyses (Required by Exploratory Plan)

Arsenic
Sodium
Potassium
Calcium
Magnesium
Mercury
Molybdenum
Nickel
Vanadium
Zinc
Sulfur
Nitrogen
Boron
Selenium
Cadmium
Chromium
Cobalt
Copper
Fluorine
Lead
Total Exchangeable Cations
Total Water Soluble Salts
Moisture
Chloride
Organic Matter
Iron
Water soluble sodium
" " potassium
" " magnesium
" " calcium
" " iron
Nitrate
Available phosphorus
Exchangeable sodium
pH
Particle size distribution & classification

Chemical Analyses (Required by Oil Shale Supervisor)

Antimony
Fluoride
Cation Exchange Capacity
Extractable Cations
- Na
- Ca
- Mg
- K
Organic carbon
Total phosphorus
Gypsum
Lime ($CaCO_3$ equivalent)
Salinity (electrical conductivity)

Trace Elements Analyses (Required by Exploratory Plan)

Antimony
Arsenic
Boron
Cadmium
Chromium
Cobalt
Copper
Fluorine
Iron
Lead
Magnesium
Mangonese
Mercury
Molybdenum
Nickel
Selenium
Sodium
Vanadium
Zinc
Others, if their concentrations are found to be significantly high

CHEMICAL ANALYSIS B

Chemical Properties

Elemental analysis,
Mineralogical analysis,
Cation-exchange capacity,
Hydrogen-ion activity (pH),
Soluble salt,
Nitrogen (total organic,
  inorganic gaseous),
Carbon (total inorganic
  Carbonate),
Organic matter,
Antimony,
Cadmium,
Mercury,
Extractable cations,
  -Na
  -Ca
  -Mg
  -K
Gypsum,
Lime ($CaCO_3$
  equivalent)

Physical Properties

Porosity,
Composition of soil atmosphere,
Temperature,
Particle size distribution,
Bulk density,
Clay analysis

Soil Water

Total water content,
Water diffusivity,
Water capacity,
Water availability,
Evapotranpiration

Radioactivity

Background radioactivity,
Natural uranium,
Thorium 230,
Radium 226,
(May be required by mining
 supervisor.)

CHEMICAL ANALYSIS C

Physical Properties

Liquid limit
Moisture - saturation
  percentage at
  - 1/3 atmosphere
  - 15 atmosphere
Particle size
  distribution
Plastic index

Radiation

Tritium
Radium 226
Total alpha
Total beta
Uranium

Chemical Properties

Arsenic
Antimony
Cadmium
Fluoride
Mercury
Selenium
Boron
Cation exchange capacity
Extractable cations
  - Ng
  - Cp
  - Mg
  - K
Gypsum
Iron
Zinc
 Lime ($CaCO_3$ equiv.)
Nitrogen (total)
Organic carbon
Ph
Phosphorus (available)
Phosphorus (total)
Potassium
Salinity (electrical conductivity)

CHEMICAL ANALYSIS D

Soils Properties Estimates

Depth to seasonal watertable
Hydrologic soil group
Classification (USDA texture, Unified and AASHO)
Percent of material less than 3 inches
Liquid limit
Plasticity index
Permeability (insitu)
Available water capacity
Soil reaction
Salinity
Shrink swell potential
Corrosivity
Erosion factor
Wind erodibility group
Flooding
High water table
Cemented Pan
Bedrock
Subsidence
Potential frost action

ANALYSIS E

Textural classification
Water holding capacity
Available plant nutrients ppm
PH
Salinity Mmhos/cm
Na, Meg/100 g
Organic matter percentage
Organic N, lbs/acre

NOISE

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
db-A Weighted Amplitudes	EP (26)	-	EP (74)	one time per year	-	quarterly
Broad Bank Spectra	EP (26)	-	-	"	-	-
Octave Band Spectra	EP (26)	-	-	"	-	-
Background Levels	EP (26)	-	EP (73)	"	-	quarterly
Noise Profiles	-	-	EP (73)	-	-	quarterly

SEISMICITY

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Literature Search	EP (26)	-	-	written 300 miles of tract	-	-
Contract Existing Observation and Recording Stations	EP (26)	-	-	"	-	-
High Resolution Reflection Seismic Lines	EP (38)	-	-	summer 1974	-	-
Instrumentation for Monitoring	-	-	EP (132)	-	-	continuous
Possible Sharp Profiles Across Western Edge of Tract In Valleys	EP (38)	-	-			
Off Site Monitoring With USGS Approval			EP (134)			

AESTHETICS/SCENIC VALUES

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Qualitative Assessment of Area	EP (24,25)	EP (27)	-	on-site	on-site	-
Enumeration of Major Scenic Elements	-	EP (27)	-	-	on-site	-
Location of Sensitive Areas	EP (24,25)	EP (27)	-	-	on-site	-
Physical Features	-	-	EP (147)	-	-	
Biologic Features	-	-	EP (147)	-	-	
Human Interest Features	-	-	EP (147)	-	-	
Recommendations to Minimize Visual Imports	-	EP (27)	-	-	on-site	-

Features	Right			Left		
	E-e	E-a	E-e & E-a	D-e	D-a	D-e & D-a
Qualitative Assessment of Area	EF (E4,E3)	EF (E3)	-	DF-slix	DF-slix	-
Description of Major Smooth Elements	-	EF (E3)	-	-	DF-slix	-
Location of Sensitive Areas	EF (E4,E3)	EF (E3)	-	-	DF-slix	-
Physical Features	-	-	EF (LA3)	-	-	-
Display Features	-	-	EF (LA3)	-	-	-
Other Interest Features	-	-	EF (LA3)	-	-	-
Correspondence to Physical Layout Layers	-	EF (E3)	-	-	DF-slix	-

AESTHETICS/SCENIC VALUES (CONCLUDED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Photos of Representative Visual Elements	EP (24,25)	EP (27)	EP (147)		on-site	
Use of Other Environmental Programs For Evaluation	EP (24,25)	-	-		-	-

ARCHAEOLOGY, HISTORIC AND SCIENTIFIC VALUES

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Cultural Investitations	EP (24) OSS 10/2/74 (1,2,3)	EP (28) OSS 10/2/74 (1,2,3)	EP (144)			
Objects of historic, scientific interest not removed or destroyed	OSS 10/2/74 (2)	OSS 10/2/74 (2)	EP (145)			
Review Literature	-	EP (28)	EP (144)			
Studies conducted under supervision of qualified professional	EP (24) OSS 10/22/74 (1)	OSS 10/2/74 (1)	EP (145)			
Finds Formerly Reported Immediately and Catalogued	OSS 10/2/74 (3)	EP(28) OSS 10/2/74 (3)	EP (145)			
Test Archaeological Potential	EP (24)	-	EP (144)			
Maps of Sites/Surface Survey	-	EP (28)	EP (145)			

PARAMETER	TEST			SATISFACTORY/UNSATISFACTORY		
	D-a	D-b	D-a & D-b	D-a	D-b	D-a & D-b
Physical Inspection	DT (20) DSR 10\12\7a (1.5.3)	DT (20) DSR 10\12\7a (1.5.3)	DT (144)			
Choice of Material, Material Interest Not Limited or Restricted	DSR 10\12\7a (3)	DSR 10\12\7a (3)	DT (143)			
Device Listening	-	DT (20)	DT (144)			
Studies Conducted Under Supervision of Qualified Professional	DT (24) DSR 10\12\7a (4)	DSR 10\12\7a (1)	DT (143)			
Items Formerly Rejected Inexplicably and Overlooked	DSR 10\12\7a (3)	DT(20) DSR 10\12\7a (1)	DT (143)			
Test Instrumental Potential	DT (24)	-	DT (144)			
Type of Discrimination Device	-	DT (20)	DT (143)			

ARCHAEOLOGY, HISTORIC AND SCIENTIFIC VALUES (CONCLUDED)

PARAMETER	TRACT			FREQUENCY/COMMENTS		
	C-a	C-b	U-a & U-b	C-a	C-b	U-a & U-b
Site Significance	-	EP (28)	-			
Courses of Action	-	EP (28)	-			

APPENDIX III

MANAGEMENT AIDS

Management Aids

Figures and present formats for wall charts recommended for use by the AOSS in keeping track of progress on the prototype oil shale program. These charts are designed to be attractive as well as functional. To insure that the charts are long lasting it is further recommended that they be composed of a rigid baseboard and incorporate magnetized symbols and tilling materials. These items are commercially available and a sample bill of materials needed to construct each chart is set out below. Catalog references and those used by Magna Chart Systems*.

a.	36" x 48" Framed magnetic background board, 1" x 1" grid, Gray (BFG-6)	$42.00
b.	Chart indicators, in sets of 20	
	M1-10 (1), 1/2" white triangles ( )	$ 2.40
	M150 (1), 1/2" white arrows ( )	$ 2.40
	MMS-1 (2), 1" yellow arrows ( )	$ 2.40
c.	Magna ribbon, 1/8" x 30", MR1-(2)(yellow) @ .45 (cut to length for highlighting)	$ 4.50
d.	Magna ribbon, 3/4" x 30", MR6-(1)(white) @ 1.05 (tilling, cut to length, write on, wipe clean)	$10.50
	Estimated total less taxes and shipping costs	$64.20

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St. Louis, Missouri 63124
(314) 962-9804

APPENDIX IV

LIST OF REGULATIONS AND LAWS

Bibliography of Laws and Regulations

A. Air

Clean Air Act, 42 U.S.C. et seq., as amended.
Colorado Air Pollution Control Act of 1970, 66 C.R.S.31
Colorado Air Quality Control Regulations and Ambient Air Quality Standards, Colorado Air Pollution Control Commission
Utah Air Conservation Act, title 26, Chapter 24
Utah Air Conservation Regulations, Utah State Division of Health
Proposed Utah Air Conservation Regulations, Utah State Division of Health

B. Mining

30 CFR 231, Operating Regulations for Exploration, Development and Production
43 CFR 23, Surface Exploration, Mining and Reclamation of Lands
Oil and Gas Leases, Rules and Regulations, Colorado State Board of Land Commissioners
Mining Rules and Regulations, Colorado State Lands, State Board of Land Commissioners
Guidelines for the Design, Operation and Maintenance of Mill Tailing Ponds to Prevent Water Pollution, Colorado Water Pollution Control Commission
Guidelines for Control of Water Pollution from Mine Drainage, Colorado Water Pollution Control Commission
Colorado House Bill 1033, amending the Colorado Open Mining Land Reclamation Act of 1973

C. Oil

40 CFR 112, Oil Pollution Prevention
40 CFR 112, 114, Civil Penalties for Violation of Oil Pollution Prevention Regulations

D. Waste

Colorado Solid Waste Disposal Sites and Facilities Law, 36 C.R.S.23
Colorado Solid Waste Regulations, Colorado Regulations, Solid Waste Disposal Sites and Facilities
Code of Solid Waste Disposal Regulations, Utah Division of Health

E. Water

Federal Water Pollution Control Act, 33 U.S.C. 1151 et seq.
40 CFR 120, Water Quality STandards (Colorado River System)
40 CFR 136, Water Programs (Test Procedures for Analysis of Pollutants)
40 CFR 133, Water Programs (Secondary Treatment Information)
A Primer on Waste Water Treatment, EPA Water Quality Office
Amendments to the Colorado Water Quality Control Act by Senate Bills 86 and 91

Colorado Water Quality Standards, Classification of Interstate and Intrastate Streams
Effluent Limitations, Colorado Water Quality Control Commissions
Colorado Water Quality Control Commission, Proposed Regulations (Storm Sewers, Piled Material)
Regulations for the STate Discharge Permit System, Colorado Water Quality Control Commission
Standards for the Discharge of Wastes, Colorado Water Pollution Control Commission
Regulations Governing Individual Sewage Systems in Identified Areas, Colorado Water Waulity Control Commission
Rules for Subsurface Disposal Systems, Colorado Water Quality Control Commission
Colorado Standards for the Discharge of Wastes, Water Pollution Control Commission
Criteria Used in the Review of Waste Water Treatment Facilities, Colorado Department of Health
Colorado Water Quality Control Act, 66 C.R.S.28
Utah Water Pollution Control Act, Title 73, Chapter 14, Code of Waste Disposal Regulations, Utah State Department of Health

F. Miscellaneous

Safe Drinking Water Act, amending the Public Health Service Act
Laws and Regulations Applying to Potable Drinking Water Supply Systems, Colorado Department of Health
Criteria for Drinking Water Storage, Colorado Department of Health
Guidelines for Applying Drinking Water Standards to Regulations
Handbook of Federal and Utah State Laws on Energy/Mineral Resource Development (1/1/75)

APPENDIX V

BIBLIOGRAPHY OF INTERNAL MEMORANDA AND LETTERS

Bibliography

Internal Memoranda

1. D50-M230, D. Dominick to G. Haas, subject: Major Policy Issues Posed by the Prototype Oil Shale Leasing Program, 30 January 1975.

2. D51-M270, M. Doherty to G. Haas, subject: Trip Report on the U-a and U-b Meeting and on a Site Visit to Tracts C-a and C-b, 7 February 1975.

3. D51-M301, M. Doherty to G. Haas, subject: Modifications to the Detailed Development Plan, 28 February 1975.

4. D51-M307, H. Williams to G. Haas, subject: Comment on Content of DDP dated 24 February 1975, 4 March 1975.

5. D51-M311, H. Williams to G. Haas, subject: Due Diligence Aspects in the Prototype Oil Shale Program, 6 March 1975.

6. D51-M336, J. Clark to G. Haas, subject: Meeting with P. Rutledge, E. Hoffman on 3/21/75 to Discuss Management Plan Outline and Financial Reporting, 24 March 1975.

Letters

1. D50-198, G. Haas to C. Prien (DRI) re: Denver Research Institute consulting support to MITRE on DDP task, 17 January 1975.

2. D50-230, G. Haas to E. Hoffman (AOSS), re: cover letter for material covered to date (attached were outlines for Management Plan, DDP, Quarterly Report, Baseline Data, Regulations/Laws, etc.), 3 February 1975.

3. D50-240, G. Haas to P. Rutledge (AOSS), subject: Policy Decisions, 7 February 1975.

4. (No ID#), C. Prien (DRI) to G. Haas, re: contributions of DRI to DDP (attached), 17 February 1975.

5. (No ID#), C. Prien (DRI) to G. Haas, re: additional material for DDP outline (attached), 19 February 1975.

6. D50-259, G. Haas to Parties Interested in the Prototype Oil Shale Program, re: requesting review of proposed DDP outline (attached), 24 February 1975. (Note that this material was given very limited distribution by the AOSS.)

7. D51-318, H. Williams to J. Wilson, re: use of Colorado Legislative Retrieval System to search for laws relevant to oil shale leasing, 6 March 1975.

8. D50-283, G. Haas to P. Rutledge (AOSS), re: cover letter for third draft of DDP outline (attached), 14 March 1975.

9. D50-285, G. Haas to P. Rutledge (AOSS), re: Oversight in Prototype Oil Shale Leases, 17 March 1975.

10. (No ID#), G. Haas to E. Hoffman (AOSS), re: cover letter for monitoring program recommendations (attached), 3 April 1975.

APPENDIX VI

BRIEFING CHARTS

AND

AREA OIL SHALE SUPERVISOR'S

PROGRAM MANAGEMENT BRIEFING

AREA OIL SHALE SUPERVISOR'S PROGRAM MANAGEMENT BRIEFING

MITRE has provided the AOSS with a proposed briefing on the "Management of the Prototype Oil Shale Leasing Program." It is assumed that the briefing will be targeted to interested groups outside of the AOSS Office, principally: Lessees, supervisory staff at other levels of the Department of the Interior, and interested citizen groups. Nevertheless, this same briefing can be easily updated to introduce new office staff to the management objectives and structure of the AOSS Office.

Briefing charts are provided. These can be reproduced by the AOSS as viewgraphs, handouts, etc. To enhance the oral presentation, textual material accompany the briefing charts. Optional charts displaying detailed background information are also provided.

MITRE has made no reference to its own role in the formulation of the present and proposed management system of the AOSS Office. Rather, the emphasis has been on identifying major program objectives, the setting forth of major tasks to be performed, a recitation of the accomplishments to date, and a description of the management process by which the AOSS proposes to direct the prototype program into the future. We believe that this briefing will provide viewers with both an understanding of the responsibilities of the AOSS with respect to the prototype program and a sense of confidence that the program is being intelligently and systematically managed for the achievement of its stated objectives.

MANAGEMENT OF THE PROTOTYPE

OIL SHALE LEASING PROGRAM

PROTOTYPE OIL SHALE LEASING PROGRAM

BRIEFING OUTLINE

I. AN INTRODUCTION TO THE PROTOTYPE PROGRAM

- o OBJECTIVES
- o PARTICIPANTS
- o PHASES

II. THE PROGRAM PLANNING PROCESS

III. MANAGEMENT PLAN

DETERMINE THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF OIL SHALE PRODUCTION ON A COMMERCIAL SCALE

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*SECRETARIAL NEWS RELEASE NOVEMBER 28, 1973 (EMPHASIS ADDED)

PROTOTYPE OIL SHALE LEASING PROGRAM

I. INTRODUCTION TO THE PROTOTYPE PROGRAM — SECRETARY OF INTERIOR'S STATEMENT OF DETAILED OBJECTIVES*

DEVELOP NEW SOURCE DOMESTIC ENERGY

1. TO PROVIDE A NEW SOURCE OF ENERGY TO THE NATION BY STIMULATING THE DEVELOPMENT OF COMMERCIAL OIL SHALE TECHNOLOGY BY PRIVATE INDUSTRY;

DEVELOP ENVIRONMENTAL SAFEGUARDS AND TECHNIQUES

2. TO INSURE THE ENVIRONMENTAL INTEGRITY OF THE AFFECTED AREAS AND AT THE SAME TIME DEVELOP A FULL RANGE OF ENVIRONMENTAL SAFEGUARDS AND RESTORATION TECHNIQUES THAT WILL BE INCORPORATED INTO THE PLANNING OF A MATURE OIL SHALE INDUSTRY, SHOULD ONE DEVELOP;

PERMIT EQUITABLE RETURN FOR DEVELOPMENT OF PUBLIC RESOURCES

3. TO PERMIT AN EQUITABLE RETURN TO ALL PARTIES IN THE DEVELOPMENT OF THIS PUBLIC RESOURCE; AND

DEVELOP MANAGEMENT EXPERTISE

4. TO DEVELOP MANAGEMENT EXPERTISE IN THE LEASING AND SUPERVISION OF OIL SHALE DEVELOPMENT IN ORDER TO PROVIDE THE BASIS FOR FUTURE ADMINISTRATIVE PROCEDURES.

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*SECRETARIAL NEWS RELEASE NOVEMBER 28, 1973 (EMPHASIS ADDED)

*SECRETARIAL NEWS RELEASE NOVEMBER 28, 1972 (EMPHASIS ADDED)

DEVELOP MANAGEMENT EXPERTISE	4.	TO DEVELOP MANAGEMENT EXPERTISE IN THE LEASING AND SUPERVISION OF OIL SHALE DEVELOPMENT IN ORDER TO PROVIDE THE BASIS FOR FUTURE ADMINISTRATIVE PROCEDURES.
PERMIT EQUITABLE RETURN FOR DEVELOPMENT OF PUBLIC RESOURCES	3.	TO PERMIT AN EQUITABLE RETURN TO ALL PARTIES IN THE DEVELOPMENT OF THIS PUBLIC RESOURCE AND OIL SHALE INDUSTRY SHOULD ONE DEVELOP THAT MUST BE INCORPORATED INTO THE PLANNING OF A MATURE
DEVELOP ENVIRONMENTAL SAFEGUARDS AND TECHNIQUES	2.	ENVIRONMENTAL SAFEGUARDS AND RESTORATION TECHNIQUES AREAS AND AT THE SAME TIME DEVELOP A FULL RANGE OF TO INSURE THE ENVIRONMENTAL INTEGRITY OF THE AFFECTED.
DEVELOP NEW SOURCE DOMESTIC ENERGY	1.	SHALE TECHNOLOGY BY PRIVATE INDUSTRY) TO PROVIDE A NEW SOURCE OF ENERGY TO THE NATION BY STIMULATING THE DEVELOPMENT OF COMMERCIAL OIL

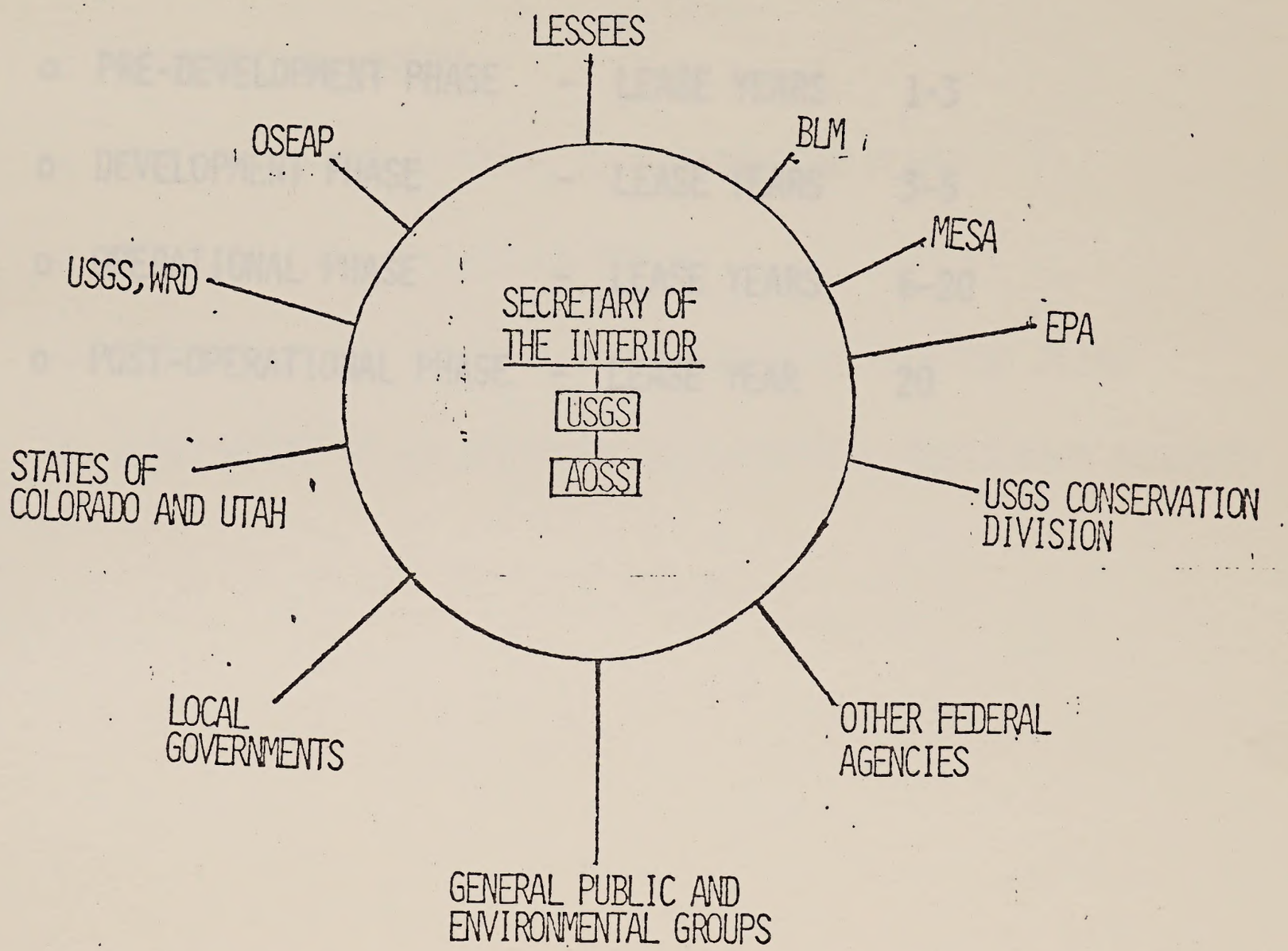
LEASING PROGRAM — STATEMENT OF DETAILED OBJECTIVES

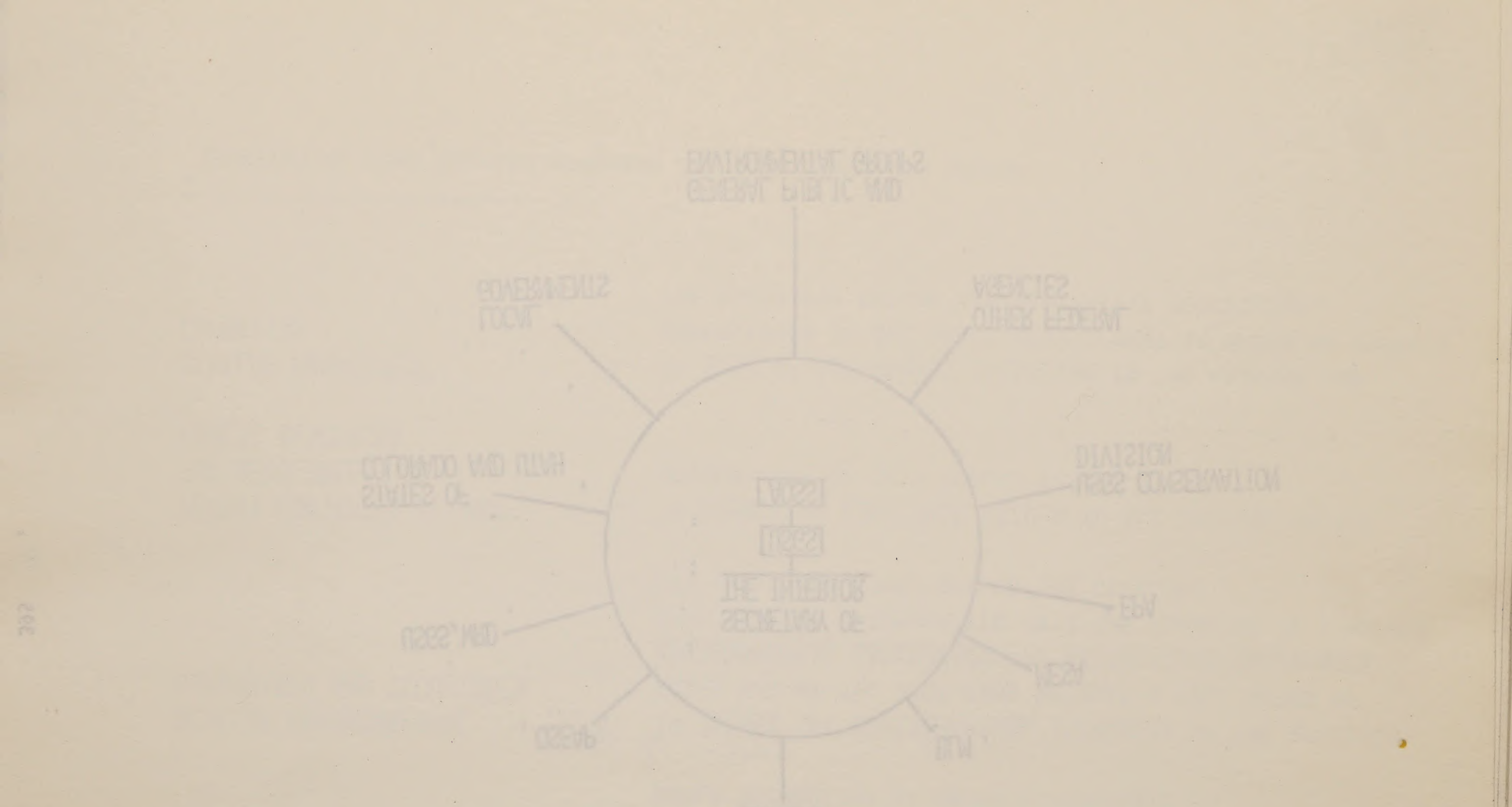
1. INTRODUCTION TO THE PROTOTYPE PROGRAM — SECRETARY OF INTERIOR'S

PROTOTYPE OIL SHALE

I. INTRODUCTION TO THE PROTOTYPE PROGRAM

KEY PARTICIPANTS





I. INTRODUCTION TO THE PROTOTYPE PROGRAM
PHASES

- PRE-DEVELOPMENT PHASE - LEASE YEARS 1-3
- DEVELOPMENT PHASE - LEASE YEARS 3-5
- OPERATIONAL PHASE - LEASE YEARS 6-20
- POST-OPERATIONAL PHASE - LEASE YEAR 20.

PRE-DEVELOPMENT PHASE - LEASE YEARS 1-3

- o ISSUANCE OF LEASES
- o SUBMISSION AND APPROVAL OF EXPLORATION PLANS
- o BASELINE DATA COLLECTION EFFORT
- o SUBMISSION AND APPROVAL OF DETAILED DEVELOPMENT PLANS
- o DEVELOPMENT OF AN APPROVED ENVIRONMENTAL MONITORING PROGRAM

A. STATEMENT OF PRE-DEVELOPMENT PHASE OBJECTIVE

B. CRITICAL PATH DEFINED

- o TASKS IDENTIFIED
- o MAJOR MILESTONES DENOTED

C. ACCOMPLISHMENTS TO DATE

FENSTAR PROGRAM PROTOTYPE CUT SHEET	PRE-DEVELOPMENT PHASE II. THE PROGRAM PLANNING PROCESS

TO EVALUATE AND APPROVE OR DISAPPROVE LESSEES' EXPLORATION PLANS; BASELINE DATA REPORTS; DETAILED DEVELOPMENT PLANS; SO THAT TRACT DEVELOPMENT AND MONITORING PROGRAMS, IF APPROVED, MAY COMMENCE PURSUANT TO THE LEASE AND APPLICABLE REGULATIONS.

- ISSUANCE OF LEASES: TERMS AND CONDITIONS OF THE LEASE AGREED TO BY LESSEES.

- SUBMISSION AND APPROVAL OF EXPLORATION PLANS: TO ALLOW LESSEES' EXPLORATORY WORK TO PROCEED AS EXPEDITIOUSLY AS POSSIBLE. PLANS FOR, SEISMIC WORK, DRILLING, BLASTING, RESEARCH OPERATIONS, CROSS-COUNTRY TRAVEL, THE CONSTRUCTION OF ROADS AND TRAILS AND OTHER NECESSARY FACILITIES, AND COLLECTION OF BASELINE DATA SHALL BE ADDRESSED.

- BASELINE DATA COLLECTION EFFORT: DATA COLLECTED ON AIR, WATER, SOIL, FLORA AND FAUNA PRIOR TO DEVELOPMENT PHASE TO ESTABLISH A DATA BASE FOR THE PURPOSE OF MEASURING THE EFFECTS OF OIL SHALE OPERATIONS ON THE ENVIRONMENT. DATA IS COLLECTED FOR TWO YEARS.

- SUBMISSION AND APPROVAL OF DETAILED DEVELOPMENT PLANS:

PURPOSE TO PROVIDE DOCUMENTATION FOR:

1. PROGRAM PLANNING BY THE LESSEES,
2. DISCLOSURE OF THE MANNER IN WHICH LESSEES INTEND TO DEVELOP THE LEASED LANDS AND SURROUNDING AREAS,
3. PREDICTION OF ENVIRONMENTAL IMPACTS OF OPERATIONS,
4. APPROVAL OF INTENDED DEVELOPMENT ACTIVITIES BY THE AOSS, AND

- ENVIRONMENTAL MONITORING PROGRAM:

REQUIRED BY ENVIRONMENTAL STIPULATIONS SEC. 1(C)(2). OBJECTIVES DEFINED: "(TO) CONDUCT A MONITORING PROGRAM BEFORE, DURING AND SUBSEQUENT TO DEVELOPMENT OPERATIONS. PROVIDE:

1. A RECORD OF CHANGES FROM CONDITIONS EXISTING PRIOR TO DEVELOPMENT OPERATIONS...,

2. A CONTINUING CHECK ON COMPLIANCE WITH THE PROVISIONS OF THE LEASE INCLUDING THESE ATTACHED STIPULATIONS AND ALL APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL REQUIREMENTS,

3. TIMELY NOTICE OF DETRIMENTAL EFFECTS AND CONDITIONS REQUIRING CORRECTION, AND

4. A FACTUAL BASIS FOR REVISION OR AMENDMENT OF THESE STIPULATIONS."

1974 1975 1976 1977

S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

1st Anniversary — Colorado Leases — Utah Leases

2nd Anniversary — Colorado Leases — Utah Leases

3rd Anniversary — Colorado Leases — Utah Leases

Begin Monitoring Program

ENVIRONMENTAL MONITORING PROGRAM

1st Annual Progress Report

2nd Annual Progress Report

Review and Evaluation

Review and Evaluation

Review and Evaluation

Review and Evaluation

Complete 1st Year BLD Collection

Complete 2nd Year BLD Collection

1 Sep.

1 Sep.

Review and Evaluation

1st Q Rep. (Data Submitted to) (AOSS's Office)

2nd Q Rep.

3rd Q Rep.

4th Q Rep.

1st Q Rep.

2nd Q Rep.

3rd Q Rep.

4th Q Rep

2 Year Baseline Data Report

Review and Modify DDP Guidelines

27 Apr

Approve and Publish DDP Guidelines

Lessee Prepares DDP

Initial AOSS R&E

Public R & E

OSEAP Internal R & E

Internal AOSS R & E

BLM R & E

R & E = Review and Evaluation

PUBLIC HEARING

Review Public Comments

Review Public hearing

Prepare Environmental Assessment

INITIAL AOSS DECISION (INTERNAL)

R & E

NOTIFY LESSEE OF DECISION (1st NOTIFICATION)

APPROVE

OR

DISAPPROVE

DEVELOPMENT

DDP Modification, If Necessary

Lessee Submits DDP#

AOSS Prepares Office for Receipt of DDP

(Lessee Re-does and) (Re-submits DDP in 1 year)

Lessee Re-submits DDP

APPROVE

DISAPPROVE

2nd Notification if Lessee has not Re-submitted DDP

DEVELOPMENT

TERMINATE LEASE

Decisions required before DDP submission:

1. Determine specific baseline data collection period.
2. Determine and approve off-site disposal sites.
3. Determine what actions constitute commencement of development.
**4. NEPA Requirements.

MASTER MILESTONE SCHEDULE

**NEPA Requirements - Choice of Critical Alternatives:

1. Negative Declaration
2. EIA
3. Supplemental EIS
4. Site-specific EIS

*Continuing requirements determine:

1. Offsettable items
2. DW diligence
3. Proprietary information
4. Extraordinary Environmental costs

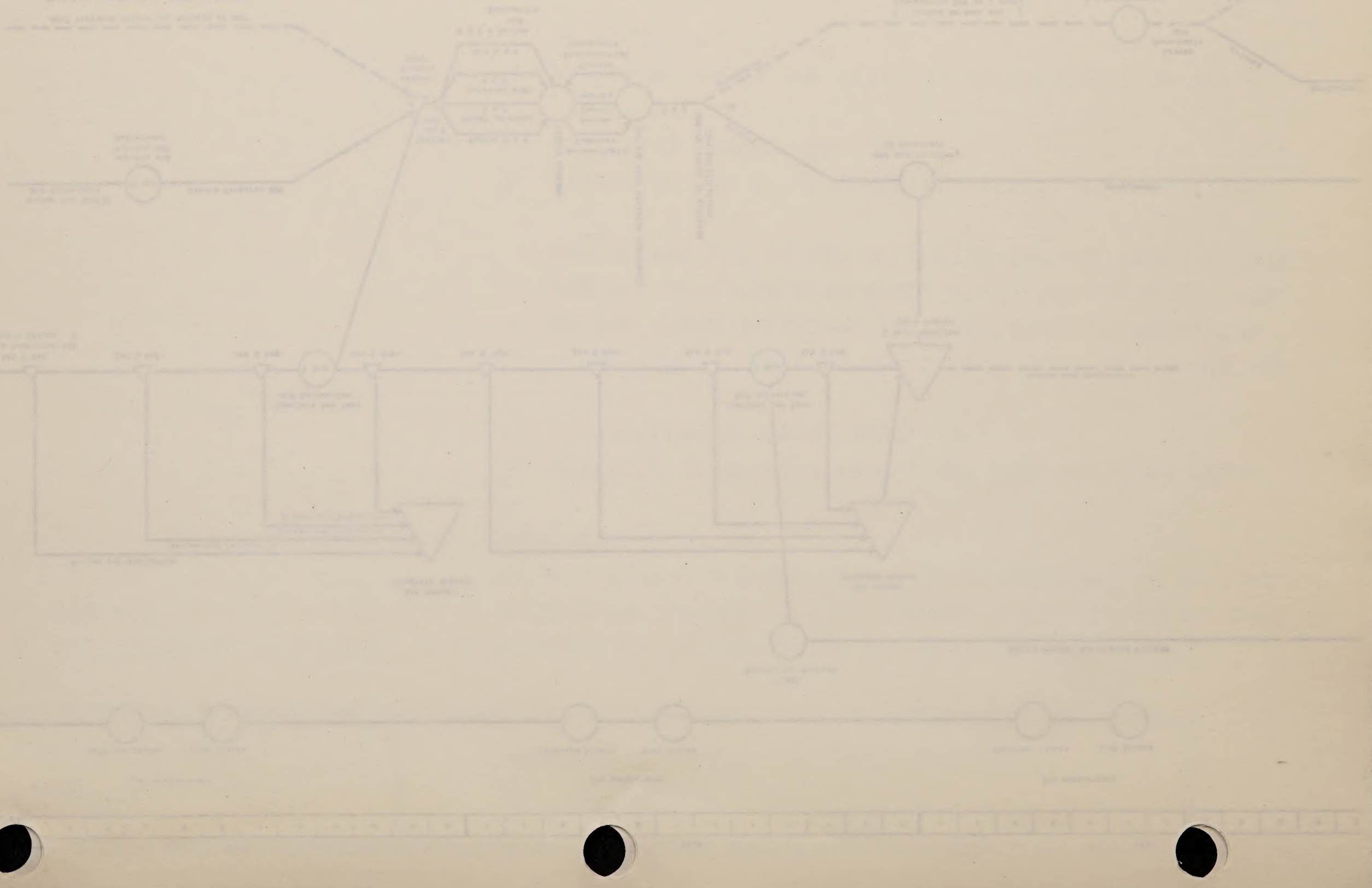
#Lessee cannot submit DDP until first full year of Environmental Baseline Data are collected. The dates listed below would be the earliest submission dates for the Lessees.

C-a: Jan.-June 1976 (depending on 84 MLSA issue)

C-b: Nov. 1975

#This chart predicated on Tract C-b schedule. However, for other Tracts simply adjust DDP submission point (approval process and monitoring program) to the appropriate dates.

MASTER MILESTONE SCHEDULE



THE FIGURE SHOWS HOW AND AT WHAT TIME PRE-DEVELOPMENT OBJECTIVES WILL BE ACCOMPLISHED.

THE TIME SCHEDULE IS PREDICATED ON TRACT C-B SUBMISSIONS.

THE TIME SCHEDULE IS AN OPTIMISTIC ESTIMATE OF TASK COMPLETION DATES.

FOCAL POINT: SUBMISSION OF DDP PREDICATED ON ONE-YEAR BASELINE DATA COLLECTION EFFORT.

BASELINE DATA COLLECTION EFFORT.

PURPOSE: TO OBTAIN A PRE-DEVELOPMENT MEASURE OF ENVIRONMENTAL CHARACTERISTICS SO THAT THE EFFECT OF DEVELOPMENT AND PROGRAM OPERATIONS ON THESE CHARACTERISTICS CAN BE MEASURED.

BASELINE DATA COLLECTION (CONTINUED):

TWO YEAR COLLECTION PERIOD - ONE YEAR TO PRECEDE SUBMISSION OF A DDP.

AT LEAST EIGHT QUARTERLY REPORTS, TWO ANNUAL PROGRESS REPORTS, AND ONE TWO-YEAR BASELINE DATA REPORT FROM EACH LESSEE.

AOSS STAFF TO REVIEW AND EVALUATE ALL REPORTS.

AOSS STAFF TO RECOMMEND CHANGES, ADDITIONS TO AND DELETIONS FROM DATA COLLECTION REQUIREMENTS.

DETAILED DEVELOPMENT PLANS:

GUIDELINE DDP SUBMITTED TO LESSEES.

LESSEES SUBMIT OWN DDP FOR REVIEW AND EVALUATION.

REVIEW AND EVALUATION BY AOSS, OSEAP, BLM, PUBLIC.

DETAILED DEVELOPMENT PLANS:

PUBLIC HEARINGS HELD.

AOSS REVIEWS ALL COMMENTS AND PREPARES AN ENVIRONMENTAL ASSESSMENT REPORT.

MAJOR POLICY ISSUES:

BEFORE RECEIPT OF DDP, DETERMINE WHAT CONSTITUTES:

ONE-YEAR BASELINE DATA COLLECTION PERIOD,
COMMENCEMENT OF DEVELOPMENT OPERATIONS.

DETERMINE NEPA REQUIREMENTS:

ALTERNATIVES INCLUDE -

SUBMIT A "NEGATIVE DECLARATION" OR AN ENVIRONMENTAL ASSESSMENT REPORT; OR PREPARE A SUPPLEMENTAL EIS; OR PREPARE A SITE-SPECIFIC EIS.

CONTINUING DETERMINATION OF:

OFFSETABLE ITEMS,
DUE DILIGENGE,
PROPRIETARY INFORMATION,
EXTRAORDINARY ENVIRONMENTAL COSTS.

- PREPARATION AND ISSUANCE OF OIL SHALE LEASE
- LEASE SALES CONDUCTED
- INDEXED AND ORGANIZED OIL SHALE LEASE REQUIREMENTS AND ENVIRONMENTAL STIPULATIONS
- DEVELOPED ENVIRONMENTAL BASELINE DATA MATRIX
- COMPILED APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS AND LAWS
- REVIEWED AND EVALUATED EXPLORATION PLANS AND ESTABLISHED A BASELINE DATA PROGRAM
- ESTABLISHED LESSEE REPORTING REQUIREMENTS
- DEVELOPED LESSEE QUARTERLY AND ANNUAL REPORT OUTLINES
- ORGANIZED A DETAILED DEVELOPMENT PLAN OUTLINE
- DEFINED MONITORING PROGRAM REQUIREMENTS

4/82

PROTOTYPE OIL SHALE
LEASING PROGRAM

III. MANAGEMENT PLAN
MANAGEMENT PROCEDURES

- ORGANIZE AN ACCOMPLISHMENT PLAN
- IMPLEMENT MANAGEMENT-BY-OBJECTIVES
- DEVELOP MANAGEMENT AIDS

ACCOMPLISHMENT PLAN

A PROGRAM PLANNING AND BUDGETING TOOL THAT:

- o ALLOCATES MANPOWER TO PRE-DEVELOPMENT PHASE TASKS
- o ILLUMINATES POTENTIAL MANPOWER SCHEDULING PROBLEMS
- o ASSIGNS TASK RESPONSIBILITY TO AOSS STAFF
- o PROVIDES A TASK COMPLETION SCHEDULE TO EVALUATE PROGRAM PROGRESS AND STAFF PERFORMANCE
- o PROVIDES A BASIS ON WHICH AOSS OFFICE BUDGETS CAN BE FORMULATED AND JUSTIFIED

TABLE 4.3
AOSS OFFICE - OUTLINE ACCOMPLISHMENT PLAN

AOSS OFFICE

OUTLINE ACCOMPLISHMENT PLAN FOR FY—

OUTLINE TASK BREAKDOWN - MANPOWER ALLOCATION

TASKS - SUBTASKS	TASK COMPLETION PERIOD	AOSS	DEPUTY OASS	C-a TRACT COORDINATOR	C-b TRACT COORDINATOR	C-a/C-b TRACT COORDINATOR	METEOROLOGIST	HYDROLOGIST	FLORA-SURFACE PROTECTION	FAUNA-SURFACE PROTECTION	ENVIRONMENTAL GEOLOGIST	GEOLOGIST	GEOPHYSICIST	MINING ENGINEER	MINING TECHNICIAN	AOSS SECRETARY	ADMINISTRATIVE ASSISTANT	STENOGRAPHER	CLERK-TYPIST	CONSULTANT SUPPORT	PART-TIME SUPPORT	TOTAL MAN-WEEKS REQUIRED
QUARTERLY BASELINE DATA REPORTS																						
1st QUARTER																						
VOLUME 1 - SUMMARY (Review)				1	1	1																3
VOLUME 2 - DATA (Review)							3	3	3	3	3	3	3	3	3							27.0
COMPILATION OF STAFF COMMENTS				0.5	0.5	0.5																1.5
2nd QUARTER																						
VOLUME 1 - SUMMARY				1	1	1																3
VOLUME 2 - DATA							3	3	3	3	3	3	3	3	3							27.0
COMPILATION OF STAFF COMMENTS				0.5	0.5	0.5																1.5
3rd QUARTER																						
(Same as Above)																						
4th QUARTER																						
(Same as Above)																						
ODP TASKS																						
PREPARATION OF ODP																						
IN-HOUSE REVIEW OF OUTLINE ODP																						
REVIEW OF OSEAP COMMENTS																						
POLICY DECISION: ONE YEAR OF BASELINE DATA																						
POLICY DECISION: NEPA REQUIREMENT																						
REVIEW OF ODP - C-b																						
IN-HOUSE TECHNICAL REVIEW																						
IN-HOUSE EAR OR NEGATIVE DECLARATION																						
SUBMIT ODP FOR PUBLIC REVIEW																						
SUBMIT ODP FOR OSEAP REVIEW																						
CONDUCT PUBLIC HEARINGS																						
REVIEW OSEAP AND PUBLIC COMMENTS																						
APPROVAL																						
REVIEW ODP WITH REGIONAL SOLICITOR																						
DRAFT APPROVAL DECISION																						
DRAFT CONDITIONAL APPROVAL DECISION																						
STAFF MEETINGS																						
AOSS WEEKLY MEETING WITH TRACT COORDINATORS (1 HOUR)		1.2	1.2	1.2	1.2	1.2																
AOSS MONTHLY MEETING WITH ENTIRE STAFF (2 HOURS)		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3			
INSPECTIONS																						
ALL FIELDS OF SPECIALIZATION ONE DAY EVERY TWO WEEKS							1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8			
•																						
•																						
•																						
REQUIRED MAN-WEEKS BY STAFF PERSON																						
LESS BUDGETED MAN-WEEKS BY STAFF PERSON																						
MANPOWER DEFICIT (SURPLUS)																						

TASK PERIOD (DATES)

BUDGETED MANPOWER

REQUIRED MANPOWER

MANPOWER SURPLUS (DEFICIT)

PROCESS TO DEVELOP AN ACCOMPLISHMENT PLAN

1. DEVELOP SCHEDULE OF BUDGETED (I.E., AVAILABLE) MAN-WEEKS FOR ALL STAFF.

2. LIST PROGRAM TASKS AND ASSIGN STAFF MAN-WEEKS AS NEEDED TO COMPLETE EACH TASK.

3. SCHEDULE OF REQUIRED MAN-WEEKS FOR EACH STAFF MEMBER DEVELOPED FROM (2).

4. COMPARISON OF BUDGETED VS. REQUIRED MAN-WEEKS FOR:

   - EACH STAFF MEMBER FOR THE YEAR
   - ALL STAFF FOR A MONTH PERIOD

5. AOSS CAN THEN PLAN TO RESOLVE THESE SCHEDULING PROBLEMS

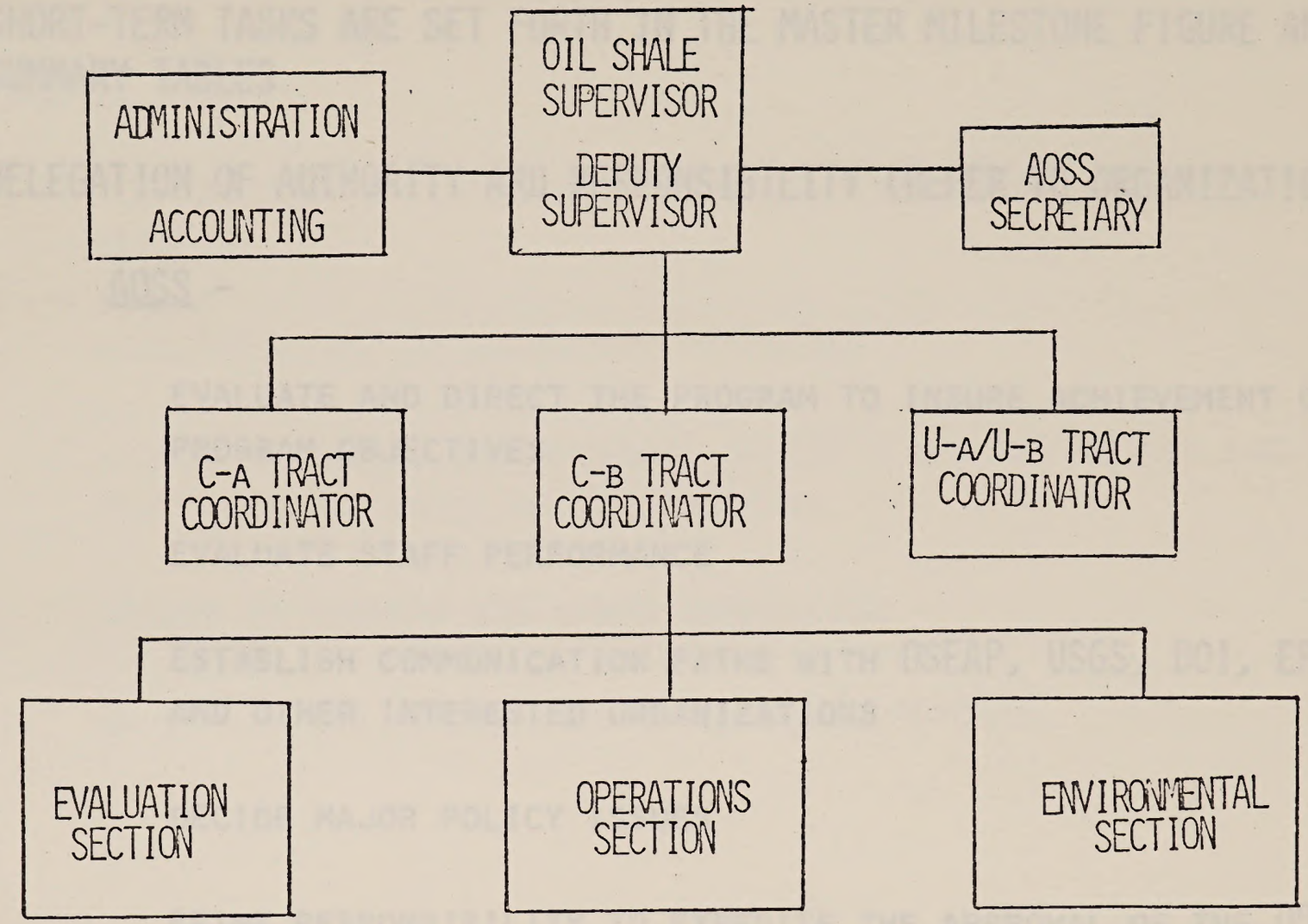
6. MAN-WEEK REQUIREMENT X SALARIES AND WAGES = BASIC BUDGET

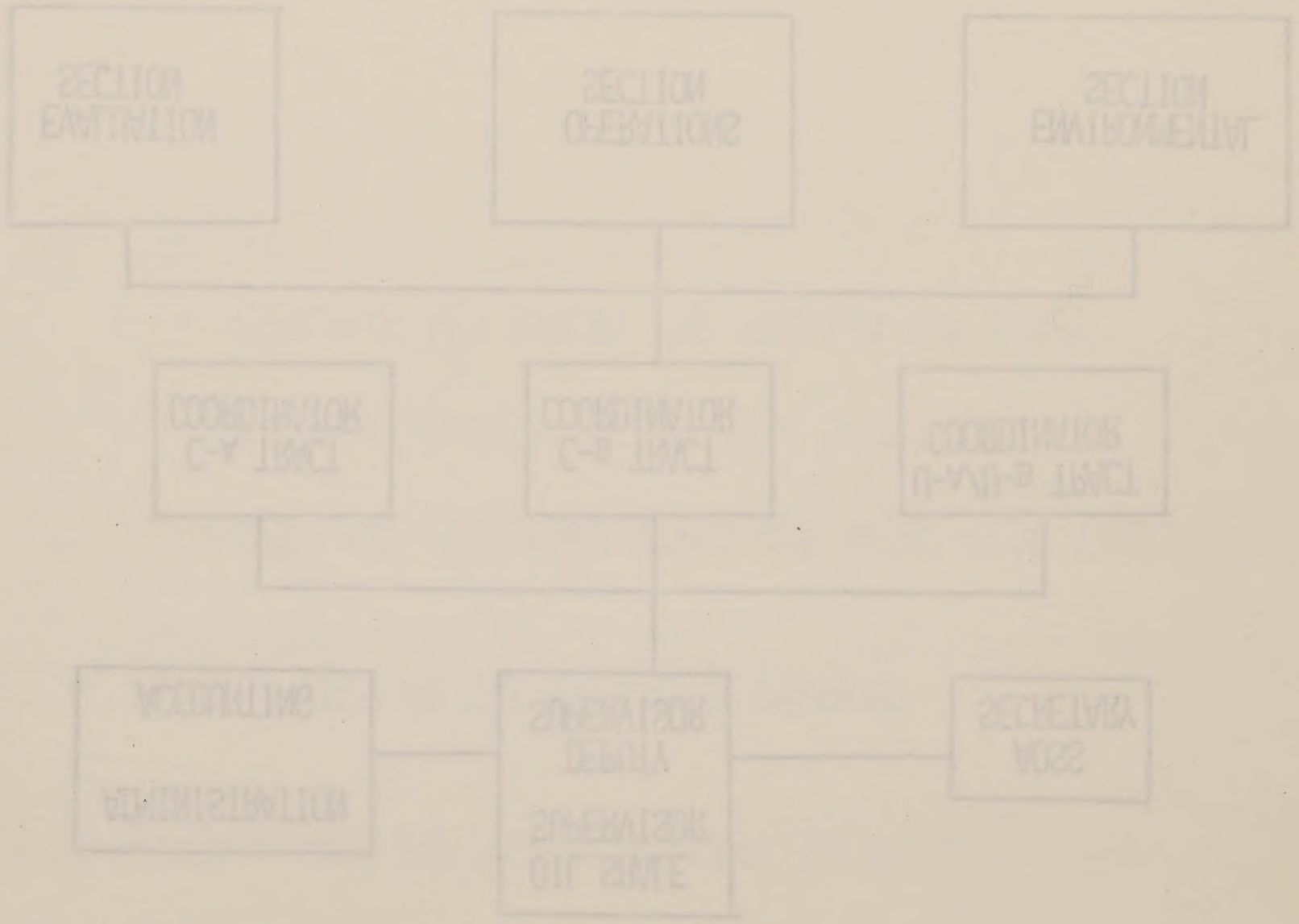
PROTOTYPE OIL SHALE
LEASING PROGRAM

MANAGEMENT-BY-OBJECTIVES

- o IT IS A WELL-DEFINED MANAGEMENT TECHNIQUE
- o PRIMARY USES IN THE PROTOTYPE PROGRAM:
  - SET LONG-TERM OBJECTIVES AND SHORT-TERM TASKS
  - DOCUMENT AUTHORITY AND TASK RESPONSIBILITY
  - EVALUATE AND DIRECT THE PROGRAM AND STAFF

AREA OIL SHALE OFFICE ORGANIZATION





- LONG-TERM OBJECTIVES OF PRE-DEVELOPMENT PHASE HAVE BEEN IDENTIFIED
- SHORT-TERM TASKS ARE SET FORTH IN THE MASTER MILESTONE FIGURE AND SUMMARY TABLES
- DELEGATION OF AUTHORITY AND RESPONSIBILITY (REFER TO ORGANIZATION CHART)

AOSS -

EVALUATE AND DIRECT THE PROGRAM TO INSURE ACHIEVEMENT OF PROGRAM OBJECTIVES

EVALUATE STAFF PERFORMANCE

ESTABLISH COMMUNICATION PATHS WITH OSEAP, USGS, DOI, EPA, AND OTHER INTERESTED ORGANIZATIONS

DECIDE MAJOR POLICY ISSUES

PRIME RESPONSIBILITY TO EXPEDITE THE APPROVAL OF THE DDP'S AND THE REVIEW AND EVALUATION OF BASELINE DATA REPORTS

AOSS (CONTINUED) -

ASSIST IN PREPARING REPORTS FOR EXTERNAL RELEASE

DEPUTY AOSS -

KEEP ABREAST OF LEGAL AND TECHNICAL ASPECTS OF THE PROTOTYPE PROGRAM

WITH AOSS, DECIDE MAJOR POLICY ISSUES

ASSIST IN EXPEDITING APPROVAL OF DDP'S AND THE REVIEW AND EVALUATION OF BASELINE DATA REPORTS

ASSIST IN PROGRAM AND STAFF EVALUATION

ASSIST IN THE PREPARATION OF EXTERNAL REPORTS

TRACT COORDINATORS -

RESPONSIBLE FOR INFORMATION CONCERNING OPERATIONS ON THEIR RESPECTIVE TRACTS

PREPARE DOCUMENT REVIEW SCHEDULES FOR BASELINE DATA REPORTS AND DDP's

INTERFACE WITH LESSEES ON TECHNICAL MATTERS

ORGANIZE, COORDINATE, AND WHERE NECESSARY, DIRECT STAFF SPECIALISTS IN ON-TRACT ACTIVITIES

STAFF SPECIALISTS -

PRIME RESPONSIBILITY TO PROVIDE TECHNICAL INFORMATION ON TRACT OPERATIONS

CONDUCT ON-SITE INSPECTIONS

KEEP CURRENT ON LATEST DEVELOPMENTS IN APPROPRIATE FIELD OF SPECIALIZATION

PROVIDE TECHNICAL INPUT FOR DDP APPROVAL PROCESS

REVIEW AND EVALUATE ENVIRONMENTAL BASELINE DATA REPORTS

o REVIEW AND EVALUATE ACCOMPLISHMENT OF GOALS

PROGRAM EVALUATION CRITERIA

- COMPARE COMPLETED TASKS WITH COMPLETION SCHEDULE FROM THE ACCOMPLISHMENT PLAN

- FROM SUMMARY REPORTS SUBMITTED BY TRACT COORDINATORS AND SPECIALISTS ASCERTAIN:

  COMPLETENESS OF LESSEE SUBMITTED REPORTS

  LESSEE COMPLIANCE WITH REMEDIAL ACTION REQUESTS OF THE TRACT COORDINATORS

- LESSEE ADHERENCE TO A SUPPORT SUBMISSIONS SCHEDULE

- RESPONSE OF OUTSIDE PARTIES TO THE PROGRAM

- o ACCOMPLISHMENT PLAN SCHEDULES TASKS TO BE COMPLETED OVER A PERIOD. TASKS COMPLETED, AT ANY POINT IN TIME, CAN BE COMPARED WITH TASKS SCHEDULED TO HAVE BEEN COMPLETED.

- o SUMMARY REPORTS WILL INDICATE FOR THE AOSS THOSE AREAS IN WHICH THE LESSEES HAVE BEEN LAX. HE CAN PERFORM A MANAGEMENT BY EXCEPTION.

- o LESSEE SUBMIT REPORTS AND PLANS ACCORDING TO A SCHEDULE BASED ON LEASE YEARS OR CALENDAR YEARS. ADHERENCE TO IT IS A MEASURE OF LESSEE COOPERATION.

- o OUTSIDE PARTIES WILL ALSO BE MONITORING THE PROGRAM. FAVORABLE RESPONSES BY THEM IS A SIGN THAT THE PROGRAM IS ACHIEVING AT LEAST ITS ENVIRONMENTAL OBJECTIVES (E.G., OSEAP, EPA).

,420

o REVIEW AND EVALUATE ACCOMPLISHMENT OF GOALS

STAFF PERFORMANCE EVALUATION CRITERIA

- COMPARE COMPLETED TASKS WITH THE COMPLETION SCHEDULE OF THE ACCOMPLISHMENT PLAN

- OBSERVE STAFF RESPONSE TO CRISIS SITUATIONS OCCURING ON TRACTS AND IN OFFICE

- MONITOR THE RESPONSE OF OUTSIDE ORGANIZATIONS TO THE ENVIRONMENTAL, ECONOMIC, AND TECHNICAL ASPECTS OF THE PROGRAM

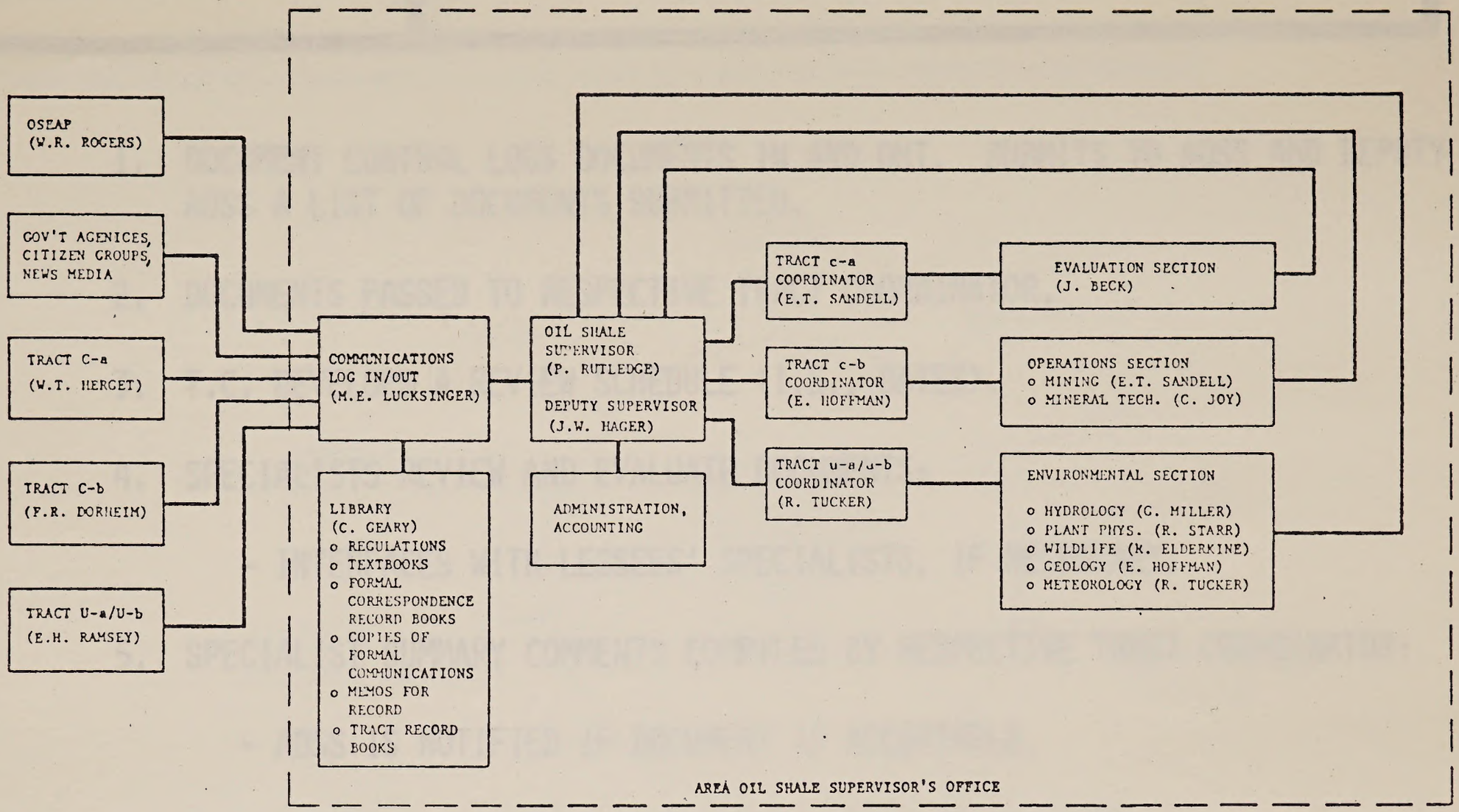
- ACCOMPLISHMENT PLAN SCHEDULES STAFF TIME OVER A SPECIFIC PERIOD. TASKS ARE ASSIGNED TO EACH STAFF PERSON. ACTUAL STAFF ACCOMPLISHMENTS CAN BE MEASURED AGAINST THIS SCHEDULE.

- ONE MEASURE OF STAFF PERFORMANCE IS TO OBSERVE THEIR ABILITY TO FUNCTION WELL UNDER ADVERSE SITUATIONS (E.G., A TIGHT SCHEDULE).

- OUTSIDE MONITORING, AS IN PROGRAM EVALUATION, APPLIES TO STAFF PERFORMANCE EVALUATION AS WELL.

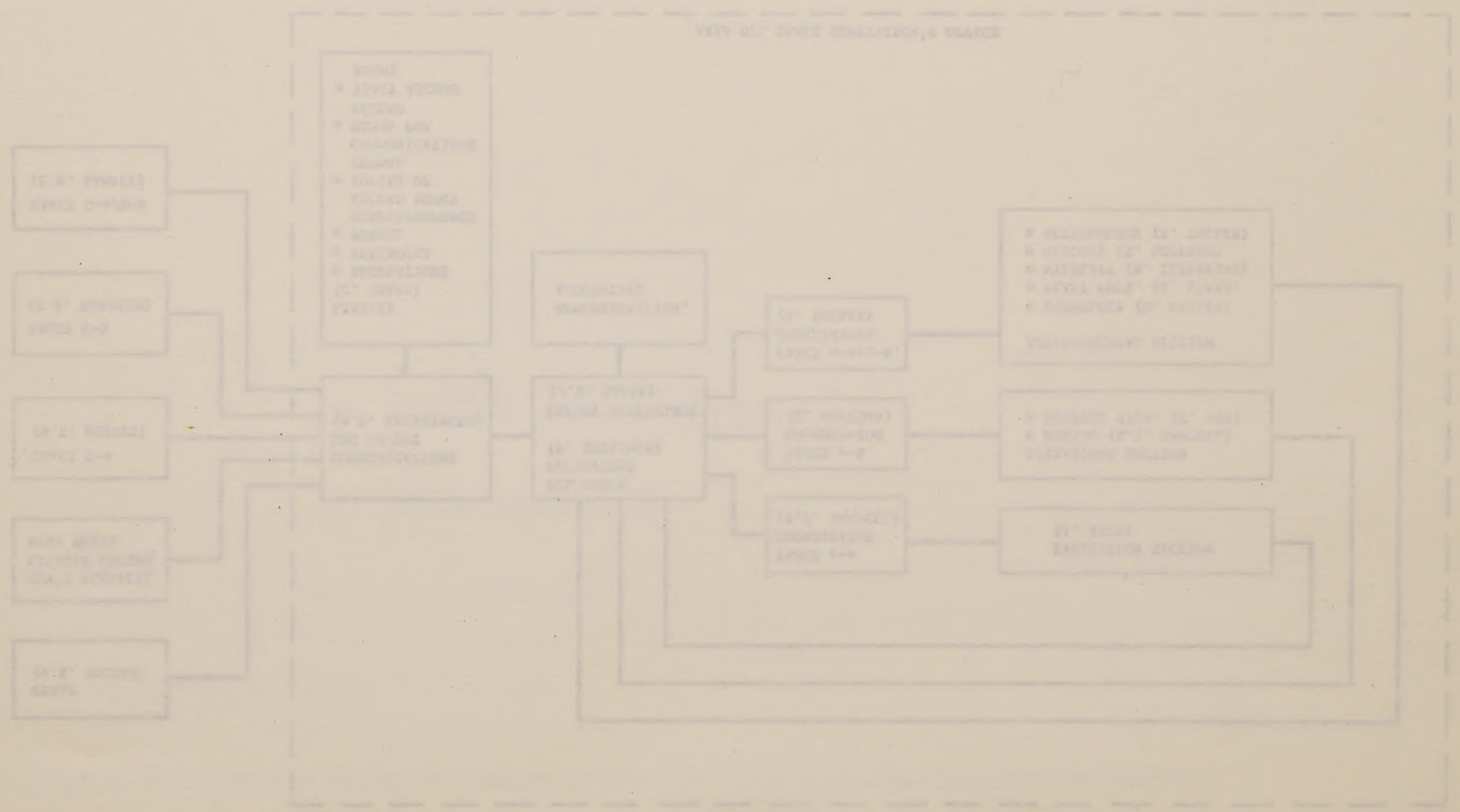
MANAGEMENT AIDS

- o DATA MANAGEMENT SYSTEM
- o MAJOR INTERFACES
- o PROGRAM PLANNING CHARTS



NOTE: This figure addresses formal workflow i.e., official correspondence, document reviews, document control, etc. AOSS staff personnel are encouraged to deal directly on an informal basis with Lessee personnel and other members of the AOSS staff. Records of these informal communications should be maintained by each member of the AOSS staff. Records of informal communications with Lessee personnel (visits, phone calls, etc.) should also be noted in appropriate books stored in the AOSS library.

FIGURE 4.2
FORMAL COMMUNICATIONS PATHS



1. DOCUMENT CONTROL LOGS DOCUMENTS IN AND OUT. SUBMITS TO AOSS AND DEPUTY AOSS A LIST OF DOCUMENTS SUBMITTED.

2. DOCUMENTS PASSED TO RESPECTIVE TRACT COORDINATOR.

3. T.C. DEVELOPS A REVIEW SCHEDULE (I.E., DATES).

4. SPECIALISTS REVIEW AND EVALUATE DOCUMENTS:

   - INTERFACES WITH LESSEES' SPECIALISTS, IF NECESSARY.

5. SPECIALIST SUMMARY COMMENTS COMPILED BY RESPECTIVE TRACT COORDINATOR:

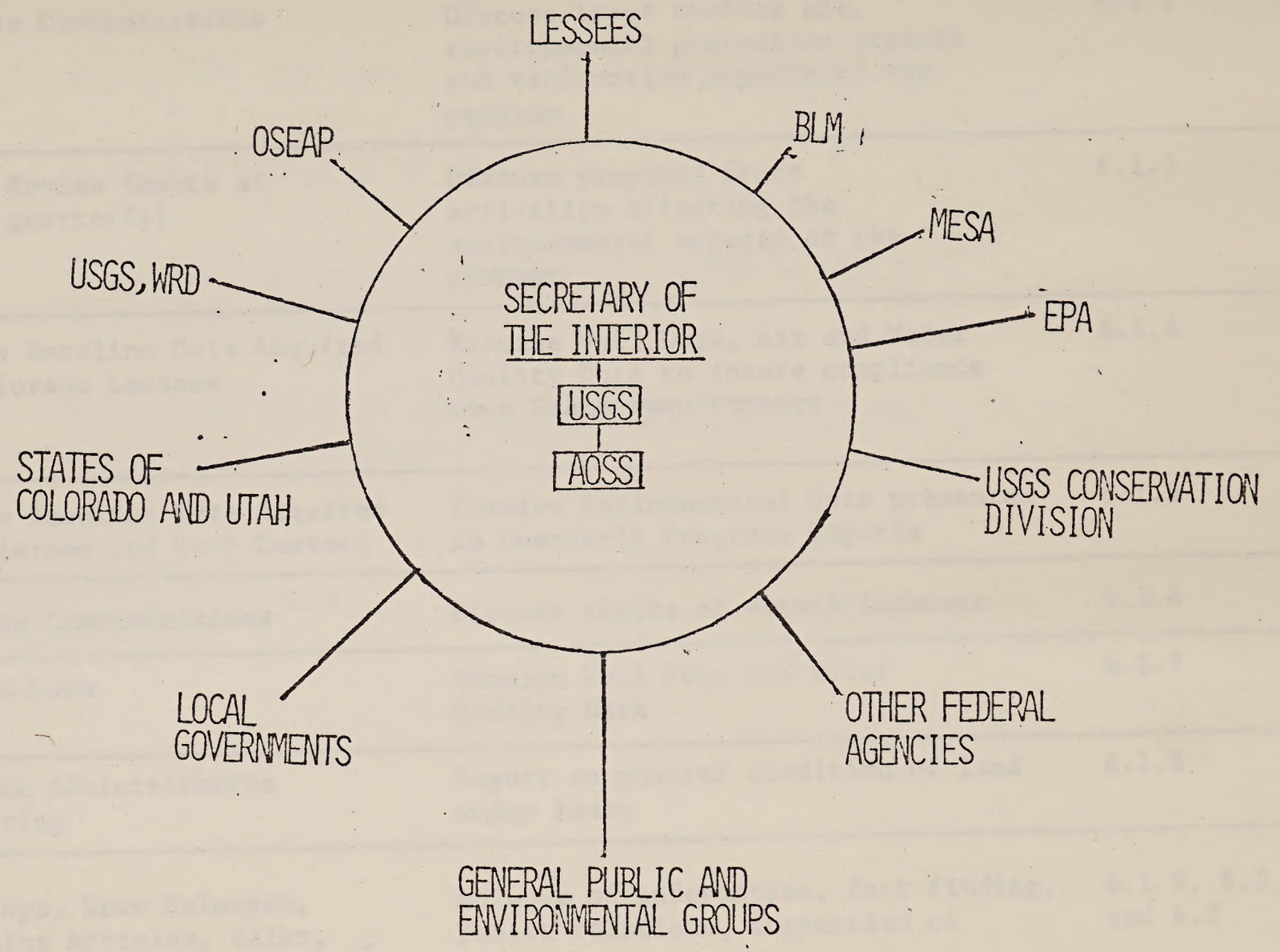
   - AOSS IS NOTIFIED IF DOCUMENT IS ACCEPTABLE.

   - LESSEE IS NOTIFIED IF FURTHER ACTION IS REQUIRED.

PROTOTYPE OIL SHALE
LEASING PROGRAM

III. MANAGEMENT PLAN
MANAGEMENT PROCEDURES

MAJOR INTERFACES



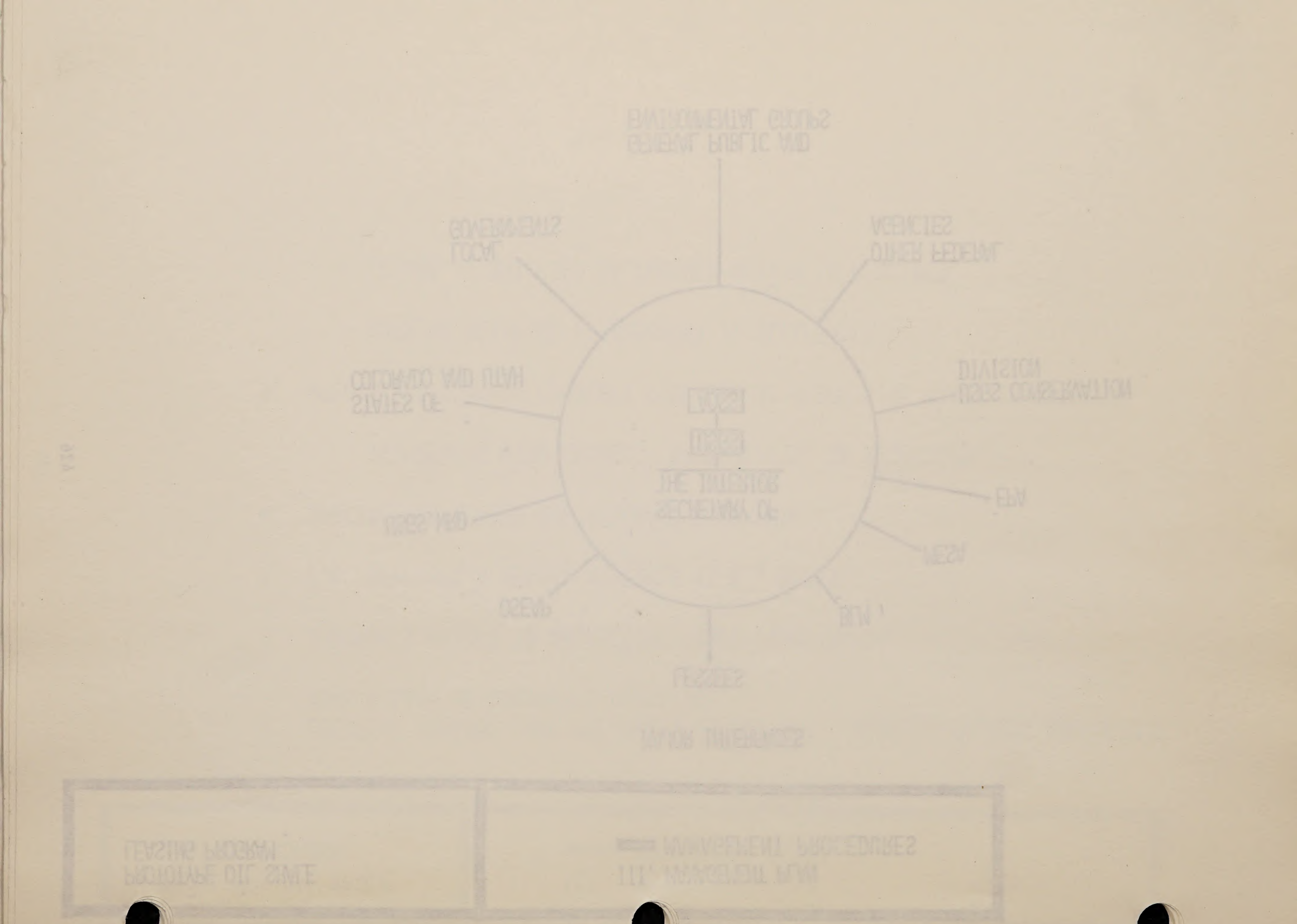


TABLE 6.1

SUMMARY OF MAJOR INTERFACES AND REVIEWS

INTERFACE	INTERACTION	PURPOSE	TEXT REFERENCE
AOSS/BLM/Lessees	Monthly Coordination Meeting	Discuss current progress	6.1.1 and 6.1.2
AOSS/Lessees	Routine Communications	Discuss status of documents, coordinate tract visits, resolve potential problems	6.1.1
AOSS/BLM	Routine Communications	Discuss tract surface use, environmental protection aspects and reclamation aspects of the program	6.1.2
AOSS/OSEAP	Panel Review (meets at least quarterly)	Discuss proposed tract activities affecting the environmental aspects of the program	6.1.3
AOSS/State of Colorado (Div of Health & State Engineer)	Review Baseline Data Acquired by Colorado Lessees	Examine Well Logs, Air and Water Quality Data to insure compliance with State requirements	6.1.4
AOSS/EPA	Review Baseline Data Acquired by Colorado and Utah Lessees	Examine Environmental Data presented in Quarterly Progress Reports	6.1.5
AOSS/MESA	Routine Communications	Discuss topics of mutual interest	6.1.6
AOSS/WRD (USGS)	Review Data	Examine Well Logs and Water Quality Data	6.1.7
AOSS/Conservation Division (USGS)	Routine Administrative Reporting	Report on general condition of land under lease	6.1.8
AOSS/General Public	Hearings, News Releases, Magazine Articles, talks, OSEAP Meetings, Quarterly Progress Reports	Release of information, fact finding, public relations, inspection of data	6.1.9, 6.2, and 6.3

INTERFACE	INTERACTION	PURPOSE	TEXT REFERENCE
ADSS/[DLN]/Lessees	Monthly Coordination Meeting	Discuss current progress	6.1.1 and 6.1.2
ADSS/Lessees	Routine Communications	Discuss status of documents, investigate tract viable, resolve potential problems	6.1.1
ADSS/[DLN]	Routine Communications	Discuss tract surface use, environmental protection aspects and reclamation aspects of the program	6.1.2
ADSS/OSEAP	Panel Review (basis at least quarterly)	Discuss proposed tract activities affecting the environmental aspects of the program	6.1.3
Colorado (Div of Health & State Engineer)	Review Baseline Data Acquired by Colorado Lessees	Quality Data to insure compliance with State requirements	
ADSS/[DLN]	Review Baseline Data Acquired by Colorado and Utah Lessees	Examine Environmental Data presented in Quarterly Progress Reports	6.1.5
ADSS/NOSA	Routine Communications	Discuss topics of mutual interest	6.1.6
ADSS/USGS (USGS)	Review Data	Examine Well Logs and Water Quality Data	6.1.7
ADSS/Conservation Division (USGS)	Routine Administrative Reporting	Report on general condition of land under lease	6.1.8
ADSS/General Public	Hearings, News Releases, Magazine Articles, talks, OSTAP Meetings, Quarterly Progress Reports	Release of information, fact finding, public relations, inspection of data.	6.1.9, 6.2, and 6.3

MANAGEMENT AIDS

- PROGRAM PLANNING CHARTS

  PROTOTYPE OIL SHALE PROJECT ACTION ITEMS - 1975

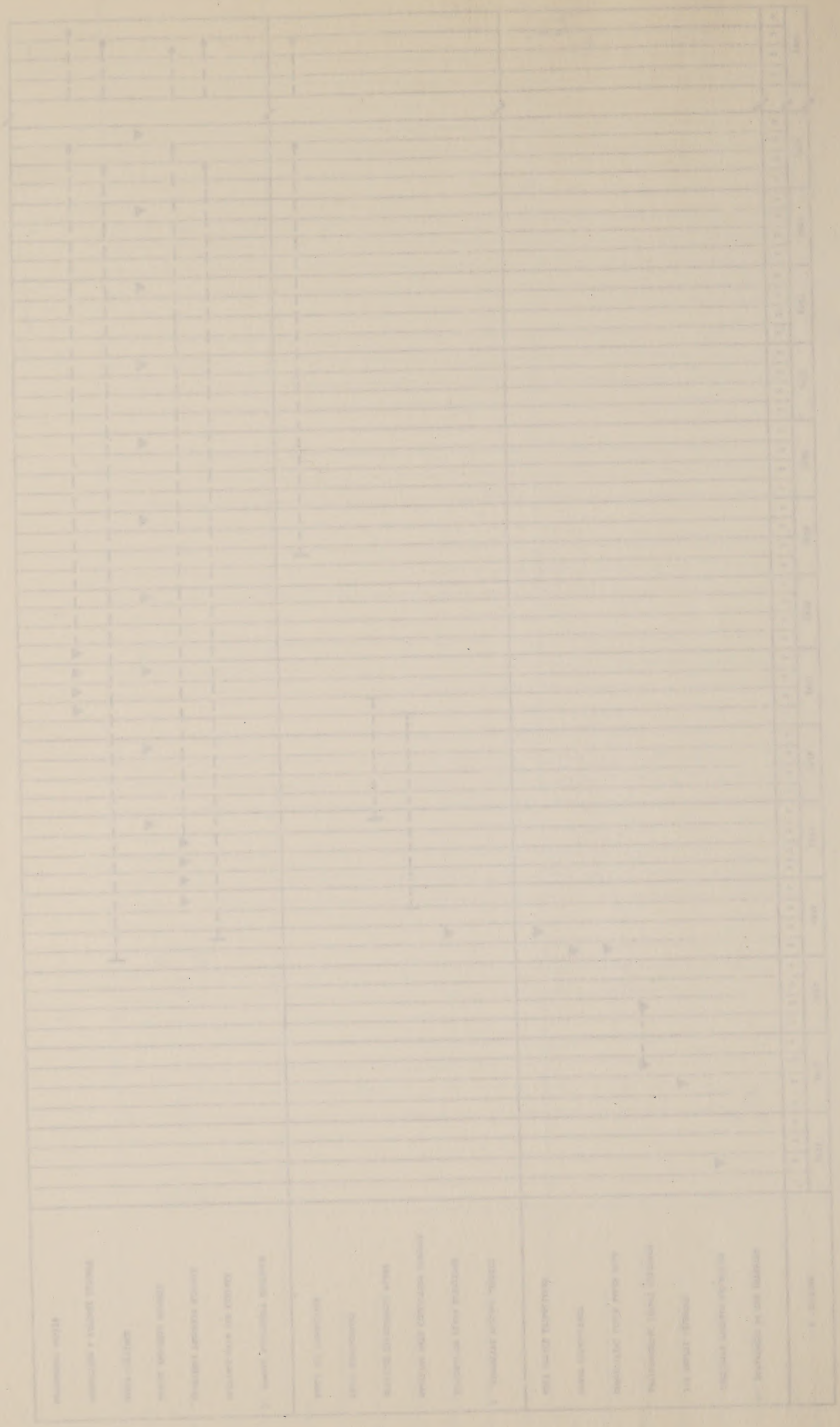
  A 20-YEAR MILESTONE CHART

  MILESTONE SUMMARY OF PLANS AND REPORTS FOR A FOUR YEAR PERIOD

  MILESTONE SUMMARY OF INSPECTIONS AND MEETINGS FOR A CALENDAR YEAR

| ACTION ITEM | WEEK BEGINNING | | |

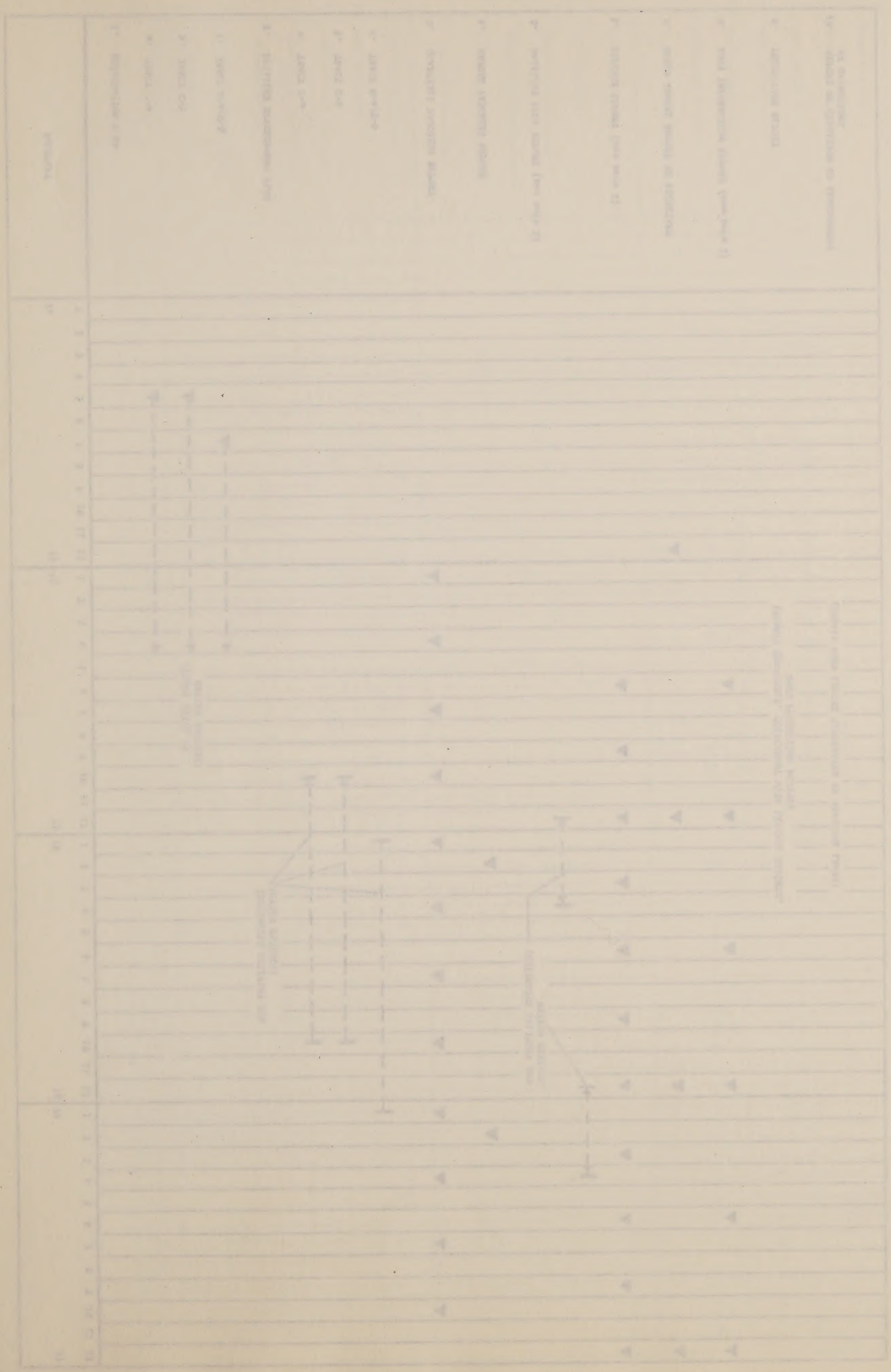
ACTIVITIES	1971				1972				1973				1974				1975				1976				1977				1978				1979				1980				1981				1982				1983				1984				1994			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. DEPARTMENT OF THE INTERIOR																																																							
PROTOTYPE PROGRAM ANNOUNCED		▲																																																					
SIX TRACTS SELECTED						▲																																																	
ENVIRONMENTAL IMPACT ASSESSED							▲	-	-	-	-	▲																																													
COMPETITIVE LEASE SALES HELD													▲																																										
OSEAP ESTABLISHED													▲																																										
AOSS OFFICE ESTABLISHED														▲																																									
2. PROTOTYPE PROGRAM LESSEES																																																						
EXPLORATION PLANS SUBMITTED													▲																																										
BASELINE DATA COLLECTION EFFORTS																																																						
DETAILED DEVELOPMENT PLANS																																																					
TRACT DEVELOPMENT																																																						
SHALE OIL PRODUCTION																																																						
3. FORMAL MANAGEMENT CONTROLS																																																					
MEETINGS WITH THE LESSEES																																																					
QUARTERLY PROGRESS REPORTS														▲	▲	▲	▲	-	-	-	-



DOCUMENT	74 1 2 3 4 5 6 7 8 9 10 11 12	75 1 2 3 4 5 6 7 8 9 10 11 12	76 1 2 3 4 5 6 7 8 9 10 11 12	77 1 2 3 4 5 6 7 8 9 10 11 12
1. EXPLORATION PLAN				
a. TRACT C-a	▲ ----	---- →		
b. TRACT C-b	▲ ----	---- → (PLANS STILL IN REVIEW PROCESS)		
c. TRACT U-a/U-b	▲ ----	---- →		
2. DETAILED DEVELOPMENT PLAN			(ESTIMATED DELIVERY AND REVIEW PERIODS)	
a. TRACT C-a			⊢ ---- ⊣	
b. TRACT C-b			⊢ ---- ⊣	
c. TRACT U-a/U-b			⊢ ---- ⊣	
3. QUARTERLY PROGRESS REPORT		▲ ▲ ▲ ▲	▲ ▲ ▲ ▲	▲ ▲ ▲ ▲
4. ANNUAL PROGRESS REPORT			▲	▲
5. BASELINE DATA REPORT (see note 1)			⊢ ---- → (ESTIMATED DELIVERY AND REVIEW PERIODS) ⊢ ---- →	
6. EXPENSE REPORT (see note 1)		▲ ▲ ▲	▲ ▲ ▲	▲ ▲ ▲ ▲
7. OSEAP ANNUAL REPORT TO SECRETARY	▲		▲	▲
8. AOSS INFORMATION REPORT (see note 1)		▲ ▲	▲ ▲	▲ ▲
9. PRODUCTION REPORT		(SUBMIT QUARTERLY, COINCIDENT WITH EXPENSE REPORTS, WHEN PRODUCTION BEGINS)		
10. REPORT OF CESSATION OR ABANDONMENT OF OPERATIONS		(SUBMIT WHEN LESSEE TERMINATES OR ABANDONS LEASE)		

NOTE: 1. ALL DOCUMENTS ARE REQUIRED EXCEPT FIRST YEAR BASELINE DATA REPORT, EXPENSE RPEORT AND AOSS INFORMATION REPORT WHICH ARE RECOMMENDED.

2. ADDITIONAL DOCUMENTATION REQUIREMENTS MAY BE IMPOSED IF THE NEED ARISES.



	JAN.		FEB.		MAR.		APR.		MAY		JUN.		JUL.		AUG.		SEP.		OCT.		NOV.		DEC.	
Inspections																								
1. Operations Inspection	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
2. Air/Water Management Inspection	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
3. Minerals Production Inspection		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
4. Rentals/Royalties/Bonding Inspection		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
5. Grading and Backfilling Inspection			(as required)																					
6. Planting Inspection			(as required)																					
7. Surface Protection and Reclamations Inspection			(as required)																					
8. Audits of Accounts and Books					C-a, C-b ▲				U-a/U-b ▲															
Meetings																								
1. OSEAP	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
2. Tract C-a	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
3. Tract C-b	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
4. Tract U-a/U-b	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	

NOTE: 1. Audits are keyed to anniversary dates.
2. OSEAP meetings will be quarterly once production begins.
3. Additional inspections and meetings may be scheduled on an ad hoc basis as the need arises.

TABLE 4.1
INSPECTIONS AND MEETINGS MILESTONE SUMMARY

1. Type 1-Fig-2	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
2. Type 2-F	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
3. Type 3-F	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
4. Other	▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲	
Functions																								
1. Matter at Atomic and Ionic						▲				▲														
2. Inelastic Interaction and Excitation																								
3. Structure Investigation																								
4. Crystal and Amorphic Substance Investigation																								
5. Photographic/Scintillation/Counter Investigation		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
6. Absolute Intensities Measurement		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
7. Wilsonian Arrangement Investigation	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
8. Scintillation Investigation	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Instruments																								

- EXAMINATION OF BOTH TABLES REVEALS THAT 1976 AND 1977 WILL BE CRITICAL SCHEDULING YEARS.

- MUCH STAFF TIME WILL HAVE TO BE DEVOTED TO REVIEW AND EVALUATION OF QUARTERLY AND ANNUAL PROGRESS REPORTS, AND IN CONDUCTING THE APPROVAL PROCESS FOR ALL THREE DDPS.

- THE ALLOCATION OF STAFF TIME DURING THESE YEARS WILL BE CRITICAL.

OPTIONAL BRIEFING CHARTS

The optional briefing charts provided below enable the AOSS to expand the detail of the prototype oil shale briefing in any one of the following four areas:

1) background of the program,

2) key participants,

3) prototype program phases,

4) accomplishments to date.

Each optional briefing area can be easily integrated into the existing briefing format with no loss of continuity to the presentation. The charts were designated as optional to control the length of the main briefing but at the same time provide the AOSS with a flexible briefing format. It is suggested that "background" charts follow the initial statement of objectives in the briefing format and "key participants" and "prototype program phases" charts could accompany their respective sections. The six "accomplishments to date" charts can be used as examples of some of the accomplishments of the AOSS Office.

DEVELOPMENT PHASE - LEASE YEARS 3-5

- o CONSTRUCTION OF MINING AND PROCESSING FACILITIES.
- o CONSTRUCTION OF TRANSPORTATION AND ACCESS FACILITIES.
- o CONSTRUCTION OF HOUSING AND SANITARY FACILITIES.
- o CONTINUED ENVIRONMENTAL MONITORING AS REQUIRED BY THE AOSS.
- o TEST RUN PLANT AND EQUIPMENT

OPERATIONAL PHASE - LEASE YEARS 6-20

- COMMENCE COMMERCIAL SCALE MINING AND PROCESSING OF OIL SHALE AND OTHER MINERALS.
- PAYMENT OF ROYALTIES.
- SUBMIT ENVIRONMENTAL, PRODUCTION AND FINANCIAL REPORTS TO THE AOSS.
- CONDUCT RECLAMATION AND REVEGETATION PROGRAMS.
- CONTINUE ENVIRONMENTAL MONITORING AS REQUIRED BY THE AOSS.

POST-OPERATIONAL PHASE - LEASE YEAR 20

- TERMINATION OF OPERATIONS

- DECOMMISSIONING OF THE PROJECT AND RELINQUISHMENT OF THE RECLAMATION BOND

TERMINATION OF OPERATIONS

- LESSOR TO NOTIFY LESSEE OF PROPOSED READJUSTMENTS OF LEASE TERMS AND CONDITIONS AT LEAST 120 DAYS BEFORE THE 20TH ANNIVERSARY.
- LESSEE TO RESPOND TO READJUSTMENTS WITHIN 60 DAYS.
- ENVIRONMENT MUST BE ADEQUATELY RESTORED BY THE LESSEE.
- LESSOR TO DETERMINE WHICH SUPPORTS, STRUCTURES, AND OTHER PROPERTY MUST BE KEPT AS A PART OF THE REALTY FOR THE PRESERVATION OF MINES OR OTHER WORKS.

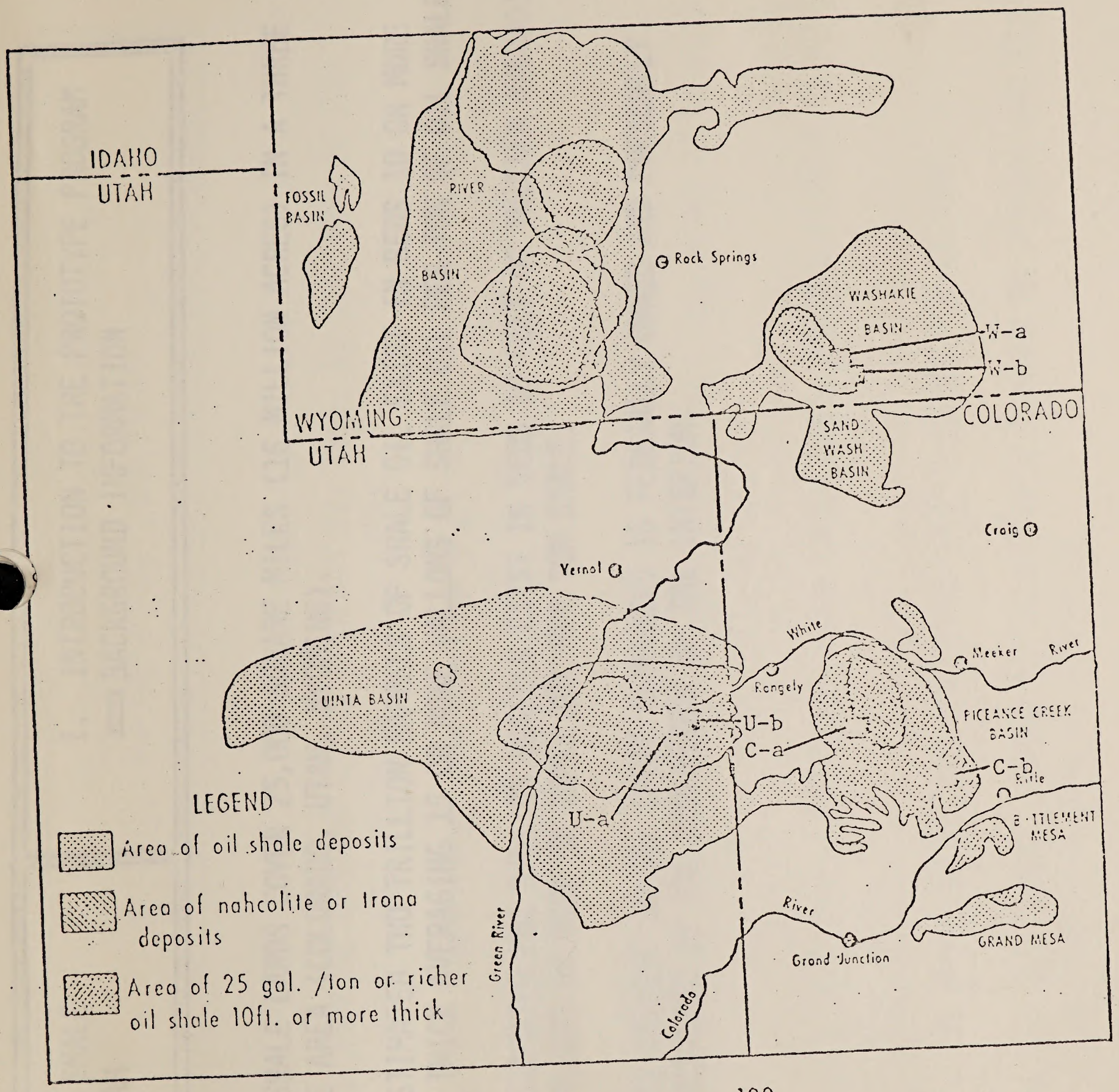
- INSPECTION OF REVEGETATION AND RECLAMATION PROGRAMS

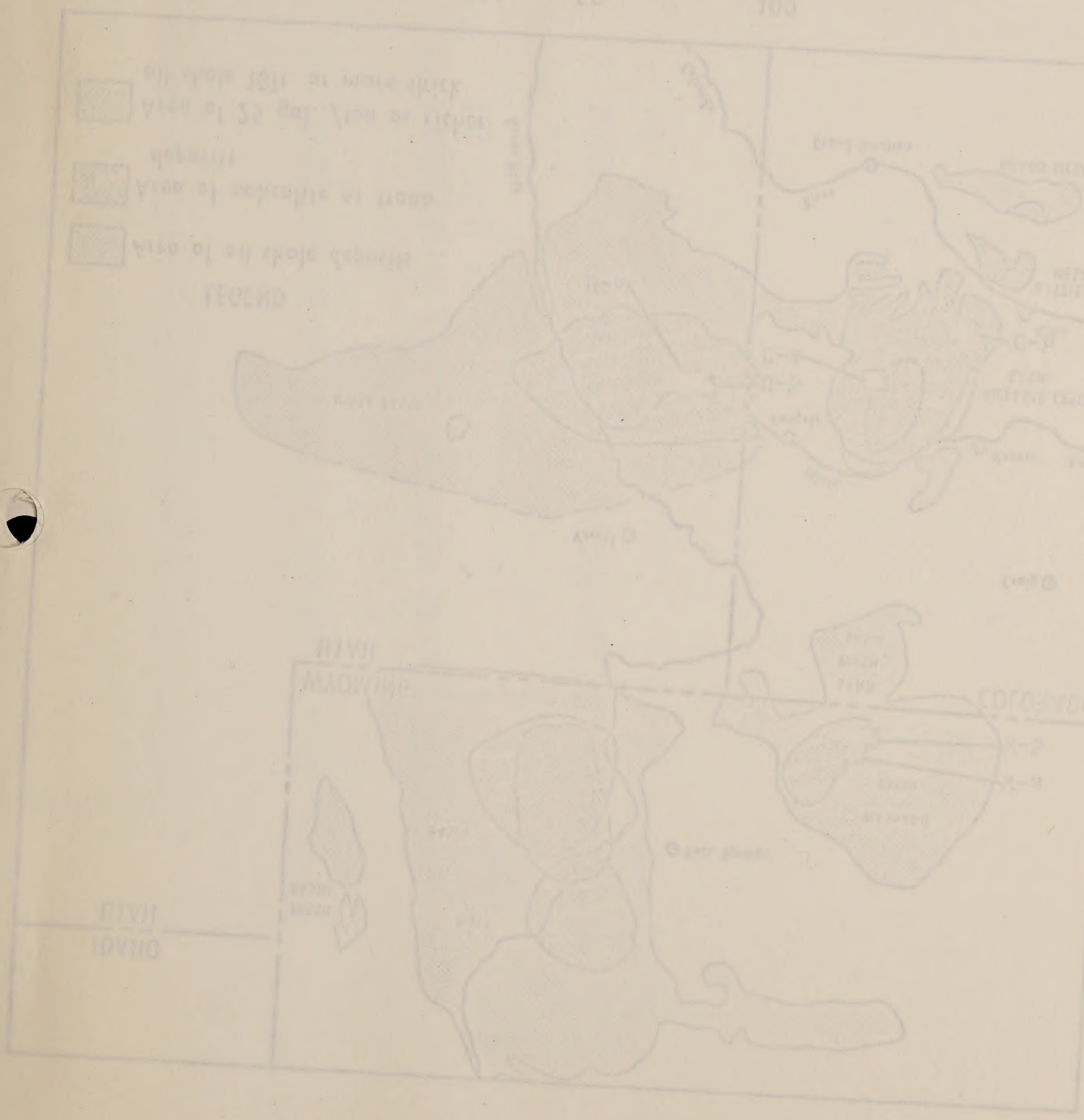
- CONSULTATION BY BLM AND OTHER INTERESTED FEDERAL, STATE AND LOCAL AGENCIES.

- DECOMMISSIONING OF THE PROGRAM AND RELINQUISHMENT OF THE RECLAMATION BOND

FIGURE 1.1

OIL SHALE AREAS IN COLORADO, UTAH AND WYOMING





PROTOTYPE OIL SHALE LEASING PROGRAM

I. INTRODUCTION TO THE PROTOTYPE PROGRAM
BACKGROUND INFORMATION

- OIL SHALE LANDS COVER 25,000 SQUARE MILES (16 MILLION ACRES) IN A THREE STATE AREA (COLORADO, UTAH, WYOMING).

- AN ESTIMATED TWO TRILLION BARRELS OF SHALE OIL EXIST IN BEDS 10 OR MORE FEET THICK AVERAGING 15 OR MORE GALLONS OF SHALE OIL PER TON OF OIL SHALE.

- AN ESTIMATED 731 BILLION BARRELS EXIST IN BEDS 10 FEET OR THICKER AVERAGING 25 GALLONS OR MORE OF SHALE OIL PER TON SHALE.

- EIGHTY PERCENT OF OIL SHALE RESOURCES IS FEDERALLY OWNED AND PRESENTLY ADMINISTERED BY THE DEPARTMENT OF THE INTERIOR.

PROTOTYPE OIL SHALE
LEASING PROGRAM

1. INTRODUCTION TO THE PROTOTYPE PROGRAM
⟹ BACKGROUND INFORMATION

PROTOTYPE OIL SHALE LEASING PROGRAM	I. INTRODUCTION TO THE PROTOTYPE PROGRAM — BACKGROUND INFORMATION

MAJOR MILESTONES

- MINERAL LEASING ACT OF FEBRUARY 25, 1920, 41 STAR 437, 30 USC AUTHORIZED LEASING OF FEDERAL LANDS.

- OIL SHALE LANDS WITHDRAW FROM DISPOSAL AND LEASING IN 1930. JANUARY 1970: DOI ESTABLISHES AN OIL SHALE TASK FORCE TO DEVELOP THE PROTOTYPE OIL SHALE LEASING PROGRAM.

- 1968 LEASE OFFERINGS: NO BIDS.

- JANUARY 1970: DOI ESTABLISHES AN OIL SHALE TASK FORCE TO DEVELOP THE PROTOTYPE OIL SHALE LEASING PROGRAM.

- 4 JUNE 1971: PRESIDENT NIXON CALLS FOR A LEASING PROGRAM TO DEVELOP OIL SHALE.

- 25 APRIL 1972: SIX OIL SHALE TRACTS CHOSEN FOR LEASING.

- 30 JUNE 1972: FUTURE DOI LEASES MUST CONFORM TO FEDERAL AND STATE ENVIRONMENTAL QUALITY STANDARDS

LEASING PROGRAM
PROTOTYPE OIL SHALE

MAJOR MILESTONES (CONCLUDED)

- 30 AUGUST 1972: FINAL EIS ON PROTOTYPE OIL SHALE PROGRAM SUBMITTED TO THE COUNCIL ON ENVIRONMENTAL QUALITY AND RELEASED TO THE PUBLIC FOR REVIEW AND COMMENT.

- 30 NOVEMBER, 3 AND 10 DECEMBER, 1973: FEDERAL REGISTER PUBLISHES NOTICES AND SCHEDULE OF LEASE SALES FINAL LEASE TERMS AND STIPULATIONS AND BIDDING PROCEDURES.

- FEBRUARY-MARCH, 1974: THE OIL SHALE TASK FORCE WAS DISSOLVED IN FEBRUARY 1974 AND THE SECRETARY OF THE INTERIOR ESTABLISHED THE OIL SHALE ENVIRONMENTAL ADVISORY PANEL.

- 8 JANUARY 1974: THE FIRST PROTOTYPE OIL SHALE LEASE SALE WAS HELD.

TABLE 1.1

LEASE SALES*

Date	Tract	High Bid	Bidder	Estimated Recoverable Resource
January 8, 1974	C-a	$210,305,600	Standard Oil of Indiana	1.3 bill. bbls. of oil in 30 gal. shale
February 12, 1974	C-b	$117,778,000	Atlantic Richfield Ashland Oil Shell Oil The Oil Shale Corp.	723 mil. bbls. of oil in 30 gal. shale
March 12, 1974	U-a	$75,596,800	Sun Oil Co.** Phillips Petroleum**	331 mil. bbls. of oil in 30 gal. shale
April 9, 1974	U-b	$45,107,200	White River Shale Oil Corp.	271 mil. bbls. of oil om 30 gal. shale
May 13, 1974	W-a	No bids received		35 mil. bbls. of oil in 20 gal. shale (in situ process)
June 11, 1974	W-b	No bids received		352 mil. bbls. of oil in 20 gal. shale (in situ. process)

* Information on this table is found in the Oil Shale Program Summary. U.S. Department of Interior, Office of the Secretary, Denver, Colorado: November, 1974, pg. 3.

** Member of White River Shale Project

Date	Tract	High Bid	Bidder	Estimated Recoverable Resource
January 8, 1974	C-a	$210,303,600	Standard Oil of Indiana	1.7 bill. bbls. of oil in 30 gal. shale
February 12, 1974	C-b	$117,778,000	Atlantic Richfield Ashland Oil Shell Oil The Oil Shale Corp.	723 mil. bbls. of oil in 30 gal. shale
March 12, 1974	U-a	$75,396,800	Sun Oil Co.** Phillips Petroleum**	331 mil. bbls. of oil in 30 gal. shale
April 9, 1974	U-b	$15,107,200	Ohio River Shale Oil Corp.	271 mil. bbls. of oil in 30 gal. shale
May 13, 1974	U-a	No bids received		35 mil. bbls. of oil in 20 gal. shale (in situ process)
June 11, 1974	U-b	No bids received		352 mil. bbls. of oil in 20 gal. shale (in situ. process)

* Information on this table is found in the Oil Shale Program Summary. U.S. Department of Interior, Office of the Secretary, Denver, Colorado: November, 1974, pp. 3.

** Member of Ohio River Shale Project

LEASE BIDDING WAS SEALED AND COMPETITIVE.

LEASE TERMS FOR 20-YEAR PERIODS ARE RENEGOTIABLE AT 20-YEAR INTERVALS.

CASH BONUS PAYMENTS - PAID IN FIVE INSTALLMENTS BEGINNING AT THE DATE THE LEASE IS SIGNED.

ROYALTY PAYMENTS - PAID ON ALL MINERALS MINED. MINIMUM RATE BEGINS IN SIXTH LEASE YEAR AND INCREASES THEREAFTER.

RENTAL PAYMENTS - $.50 PER ACRE OF TRACT LAND.

OFFSETS - RENTAL PAYMENTS MAY BE OFFSET AGAINST ROYALTY PAYMENTS.

- CERTAIN CREDITS MAY BE APPLIED AGAINST LAST TWO BONUS PAYMENTS.
- EXTRORDINARY ENVIRONMENTAL COSTS MAY BE APPLIED AGAINST ROYALTY PAYMENTS.

BONDING - $20,000 COMPLIANCE BOND, AND AN ADDITIONAL BOND, NO LESS THAN $20,000 TO ENSURE COMPLIANCE WITH ENVIRONMENTAL STIPULATIONS AND RELATED REGULATIONS TO BE MAINTAINED BY EACH LESSEE.

PROTOTYPE OIL SHALE
LEASING PROGRAM

1. INTRODUCTION TO THE PROTOTYPE PROGRAM
⟹ BACKGROUND INFORMATION

I. INTRODUCTION TO THE PROTOTYPE OPTIONAL CHART
KEY PARTICIPANTS

- LESSEES
- UNITED STATES GOVERNMENT - SECRETARY OF THE DEPARTMENT OF INTERIOR
- BUREAU OF LAND MANAGEMENT (BLM)
- GEOLOGICAL SURVEY (GS) - AREA OIL SHALE SUPERVISOR (AOSS)
- OIL SHALE ENVIRONMENTAL ADVISORY PANEL (OSEAP)
- OTHER FEDERAL, STATE AND LOCAL GOVERNMENT AGENCIES
- THE PUBLIC

LESSEES

- o DETERMINE THE BEST COMMERCIAL METHOD TO MINE, PROCESS, OR OTHERWISE DEVELOP THE LEASE DEPOSITS.

- o BEFORE DEVELOPMENT OPERATIONS MAY BEGIN, MUST:

  - SUBMIT EXPLORATION PLANS,

  - SUBMIT DETAILED DEVELOPMENT PLANS,

  - COLLECT ENVIRONMENTAL BASELINE DATA FOR TWO YEARS; ONE YEAR TO PRECEDE SUBMISSION OF A DDP, AND ESTABLISH AN ENVIRONMENTAL MONITORING PROGRAM AT LEAST SIX MONTHS BEFORE DEVELOPMENT OPERATIONS.

- o MAINTAIN PRODUCTION AND FINANCIAL RECORDS FOR INSPECTION BY THE AOSS.

LESSEES (CONTINUED)

- EXERCISE REASONABLE DILIGENCE, SKILL AND CARE IN ALL OPERATIONS ON LEASED LANDS.
- AVOID, MINIMIZE, OR REPAIR WHERE POSSIBLE, DAMAGE TO THE ENVIRONMENT.
- MAINTAIN FEDERAL, STATE, AND LOCAL WATER POLLUTION CONTROL, WATER QUALITY, AIR POLLUTION CONTROL AND AIR QUALITY STANDARDS.

LESSOR

- THE U.S. GOVERNMENT REPRESENTED BY THE SECRETARY OF THE INTERIOR.
- SECRETARIAL ORDER 2948 DELEGATES THE AUTHORITY OF THE SECRETARY TO THE BUREAU OF LAND MANAGEMENT (BLM) AND TO THE GEOLOGICAL SURVEY (GS).

BLM

- o RESPONSIBLE FOR MANAGEMENT OF OFF-TRACT LANDS.
- o CONDUCT COMPLIANCE EXAMINATIONS OF ENVIRONMENTAL PROTECTION REQUIREMENTS ON OFF-TRACT AREAS.
- o CONSULT WITH THE GS ON THE ADEQUACY OF THE SURFACE USE, ENVIRONMENTAL PROTECTION, AND RECLAMATION ASPECTS OF THE EXPLORATION AND DEVELOPMENT PLANS.
- o IS THE "OFFICE OF ACTION:" WHEN NECESSARY OR WHEN NOTIFIED BY THE GS, CAN INITIATE ACTION TO SUSPEND OR CANCEL THE LEASE.

TENSING PROGRAM PROTOTYPE OIL SHALE	⇒ KEY PARTICIPANTS (CONTINUED) 1. INTRODUCTION TO THE PROTOTYPE PROGRAM

AREA OIL SHALE SUPERVISOR (AOSS)

- RESPONSIBLE FOR MANAGEMENT OF ON-TRACT LANDS.
- MAKE ALL GEOLOGIC, ENGINEERING, AND ECONOMIC VALUE DETERMINATIONS FOR THE OIL SHALE PROGRAM.
- CONDUCT ON-TRACT INSPECTIONS TO INSURE COMPLIANCE WITH LEASE TERMS.
- SUBMIT ORDERS TO LESSEES FOR ANY REMEDIAL ACTION.
- IS THE OFFICE OF CONTROL OF ALL PROPRIETARY DATA REQUIRED TO BE SUBMITTED UNDER TITLE 30 CFR, PARTS 200, 211, 218, 221, 231, 270, AND RELATED DOCUMENTS.
- DURING THE PRE-DEVELOPMENT PHASES OF THE PROTOTYPE PROGRAM, IS RESPONSIBLE FOR GUIDING THE BASELINE DATA REPORTS AND THE EXPLORATION AND DETAILED DEVELOPMENT PLANS THROUGH THE REVIEW AND EVALUATION AND FINAL APPROVAL PROCESSES.

OSEAP

- ESTABLISHED IN MARCH 1974 UNDER THE AUTHORITY OF THE FEDERAL ADVISORY BOARD ACT (PL 92-463) AND OMB CIRCULAR A-63.

- COMPOSED OF A CHAIRMAN, APPOINTED BY THE SECRETARY, REPRESENTATIVE OF SPECIFIC BUREAUS AND OFFICERS OF DOI, REPRESENTATIVES OF OTHER FEDERAL DEPARTMENTS, STATE AND COUNTY MEMBERS, AND MEMBERS AT LARGE.

- MAIN FUNCTION IS TO ADVISE THE DISTRICT MANAGER OF THE BLM AND THE AOSS ON ENVIRONMENTAL ASPECTS OF THE PROTOTYPE PROGRAM.

- MUST SUBMIT AN ANNUAL REPORT TO THE SECRETARY SUMMARIZING THE ENVIRONMENTAL STATUS OF THE PROTOTYPE PROGRAM.

- ASSIST THE AOSS AND DISTRICT MANAGER IN CONDUCTING PUBLIC HEARINGS.

- MEET AT LEAST QUARTERLY IN OPEN SESSION.